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HANDBOOK
OF
THE BRITISH FLORA.
ILLUSTRATED.

Hester Moggridge
June 1876
To Wilfrid Clarke
Oct. 1894

HANDBOOK
OF
THE BRITISH FLORA;

A DESCRIPTION
OF
THE FLOWERING PLANTS AND FERNS

INDIGENOUS TO, OR NATURALIZED IN,

The British Isles.

FOR THE USE OF BEGINNERS AND AMATEURS.

BY
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With Illustrations from Original Drawings by W. Fitch.

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XLI. CAMPANULA FAMILY. CAMPANULACEÆ.

Herbs, with alternate, entire or toothed leaves, without stipules; the flowers most commonly blue or white, either distinct, or collected into heads with a general involucre. Calyx adhering to the ovary, with a free border of 5 teeth or lobes, sometimes very narrow and almost reduced to bristles. Corolla inserted within the lobes of the calyx, regular or irregular, with 5 teeth or lobes. Stamens 5, inserted within the corolla at its base, but otherwise free from it. Anthers distinct, or rarely cohering in a ring round the style. Style single, with an entire or divided stigma. Ovary and capsule inferior, divided into from 2 to 5 cells, with several seeds in each (or, in a very few exotic species, reduced to one seed).

A rather large family, widely spread over the temperate regions of both hemispheres, especially the northern one, and crossing the tropics chiefly in mountainous districts. The insertion of the stamens within the base of the corolla, and not upon its tube, is peculiar, among British *Monopetals*, to this Order and to the *Heath* family; and from the latter, *Campanulaceæ* are easily known by their herbaceous stems, and the number of stamens always equal to, never double, that of the lobes of the corolla.

Corolla very irregular, split open on the upper side. Anthers closely cohering 1. *Lobelia*.

Corolla regular or nearly so. Anthers free or cohering at the base only.

Segments of the corolla deep and narrow-linear. Flowers in heads or dense spikes.

Anthers united in a ring at the base. Heads small, hemispherical 2. *Jasione*.

Anthers distant. Flower-buds cylindrical, curved.

Heads globular or elongated 3. *Rampion*.

Lobes of the corolla broad and short 4. *Campanula*.

The *Trachelium cæruleum*, a south European plant of early cultivation in our flower-gardens, belongs to the same family; and the Australian *Goodenias*, *Scævolas*, and other allied plants, often seen in our greenhouses, form a small family, which may almost be considered as a tribe of *Campanulaceæ*.

I. LOBELIA. LOBELIA.

Flowers in terminal racemes, usually leafless or nearly so. Corolla very irregular, more or less cleft on the upper side, with 5 lobes usually forming two lips; the 2 upper lobes smallest, and erect or recurved; the 3 lower ones spreading, and less deeply divided. Anthers united in a tube round the style, often hairy, or the 2 lower ones bearded at the top.

A numerous genus, widely spread over the globe, and yet wanting in the greater part of the continent of Europe and northern Asia. Several North American species, with brilliant scarlet or purple flowers, as well as Cape or Australian ones with blue flowers, are much cultivated in our gardens.

Aquatic plant. Flowers drooping 1. *Water L.*
Heath plant. Flowers erect 2. *Acrid L.*

1. Water Lobelia. *Lobelia Dortmanni*, Linn. (Fig. 604.)

(Eng. Bot. t. 140.)



Fig. 604.

An aquatic perennial, with tufts of nearly cylindrical, hollow, radical leaves, 1 to 2 inches long, forming a dense green carpet at the bottom of the water, each tuft proceeding from a small thick stock, with filiform creeping runners. Flowering-stems erect and simple, rising about 6 or 8 inches above the surface of the water, almost leafless. Flowers pale blue, 6 or 7 lines long, drooping, in a simple, loose terminal raceme.

In the shallow parts of the lakes of northern Europe and America. Common in the lakes of Scotland and Ireland, and, in the West of Great Britain, descending as far south as Shropshire and South Wales. *Fl. summer.*

2. **Acrid Lobelia.** *Lobelia urens*, Linn. (Fig. 605.)

(Eng. Bot. t. 953.)

Rootstock perennial, shortly creeping, with obovate or oblong radical leaves. Stems simple or slightly branched, erect, 1 to 1½ feet high, bearing in the lower half lanceolate, slightly toothed leaves, and in the upper part a long slender raceme of erect, purplish-blue flowers, about the size of those of the *water L.*

In moist heaths, in western Europe, from Andalusia to western and central France. In Britain, only on a common near Axminster in Devon, where it has been fast disappearing in consequence of enclosures, and will probably soon have to be expunged from our flora. *Fl. end of summer and autumn.*



Fig. 605.

II. **JASIONE.** JASIONE.

Flowers blue, in small, terminal, hemispherical heads, surrounded by an involucre of several bracts. Calyx reduced to 5 very narrow, slender lobes. Corolla regular, deeply divided into 5 narrow segments. Anthers united at the base into a ring round the long club-shaped style.

Besides our British species, the genus contains two or three nearly allied perennials, chiefly from the mountains of central and southern Europe and western Asia. The flower-heads of this genus show the nearest approach to *Composites*, from which however the many-seeded capsules at once distinguish it.

1. **Sheep's-bit Jasione.** *Jasione montana*, Linn. (Fig. 606.)(Eng. Bot. t. 882. *Sheep's-bit.*)

Root annual or biennial, bearing in the latter case tufts of radical leaves which live through winter. Stems sometimes short and decumbent or ascending, sometimes nearly erect, a foot high, with a few



Fig. 606.

spreading branches. Leaves linear or lanceolate, waved on the edges, and more or less hairy. Flower-heads, in the British variety, about half an inch diameter, on long terminal peduncles; the involueral bracts broadly ovate, the flowers or florets small, of a rather pale blue, on short pedicels.

In heathy pastures, on banks, etc., throughout Europe, except the extreme north, and eastward to the Caucasus. Extends almost all over England and Ireland, but very local in Scotland. *Fl. summer*. On the Continent the size of the flowers and the whole habit of the plant are very variable.

III. RAMPION. PHYTEUMA.

Flowers (in the British species) in compact terminal heads or spikes. Corolla when in bud cylindrical and curved, opening more or less into 5 long linear segments. Anthers free and distinct. Style cleft at the top into 2 or 3 stigmatic lobes. Capsules crowned by the spreading teeth of the calyx, and bursting at the sides.

A small genus, spread over Europe and Western Asia, but chiefly in the great central mountain-chains, ascending to great elevations. It is readily known by the long, curved flower-buds.

Flower-heads globular	1. <i>Round-headed R.</i>
Flower-heads oblong, becoming at length cylindrical	2. <i>Spiked R.</i>

1. Round-headed Rampion. *Phyteuma orbiculare*, Linn.

(Fig. 607.)

(Eng. Bot. t. 142.)

Rootstock thick or shortly creeping, with simple, erect or slightly decumbent stems, 6 to 18 inches high. The early radical leaves are ovate and cordate, on long stalks, the subsequent ones and lower stem-leaves stalked, but narrow-oblong or lanceolate; the upper ones few, narrow, and sessile. Flowers of a deep-blue, in a globular terminal

head of nearly an inch in diameter, surrounded by a few short, broadly lanceolate bracts.

In pastures, throughout central and southern Europe, but not extending into Scandinavia. In Britain, only on the chalk downs of southern England. *Fl. summer.*



Fig. 607.

2. Spiked Rampion. *Phyteuma spicatum*, Linn. (Fig. 608.)

(Eng. Bot. Suppl. t. 2598.)

A taller and stouter plant than the last, with longer and broader leaves, the lower ones 2 to 4 inches long and an inch or more in breadth, on stalks of 3 or 4 inches; the upper ones few, smaller and narrower. The flowers form at first an ovoid head, which soon becomes a dense spike 2 inches or more in length. The corollas of a very pale dull-blue or yellowish-white.

Widely spread over central, and especially south-central Europe, extending northwards into Norway. In Britain, only about Waldron, in eastern Sussex. *Fl. summer.*



Fig. 608.

IV. **CAMPANULA.** CAMPANULA.

Flowers in panicles, racemes, or spikes, sometimes contracted into short leafy heads, or rarely solitary. Corolla regular or nearly so, bell-shaped, broadly tubular or rotate, with 5 broad or lanceolate lobes. Anthers distinct. Style cleft at the top into 2, 3, or 5 stigmatic lobes. Capsule crowned by the teeth or lobes of the calyx, and opening laterally or at the top.

A numerous genus, widely spread over the globe, chiefly in the northern hemisphere or in the mountain-ranges of the hotter regions, with a few extratropical southern species. Taken as a whole, it is a natural and readily recognized group, but diversities in the opening of the capsule, and several minor points, have induced modern botanists to subdivide it into three or more separate genera. Their characters are, however, so little in accord with their general habit, that they may be more conveniently considered as sub-genera or sections.

Calyx-tube and capsule long and narrow. Corolla rotate

(SPECULARIA) 9. *Corn C.*

Calyx-tube short and broad. Corolla bell-shaped.

Delicate, prostrate plant, with nearly orbicular, angularly toothed leaves. Capsule opening at the top (WAHLENBERGIA) 8. *Ivy C.*

Stems erect or ascending. Upper leaves narrow or pointed. Capsule opening at the sides.

Stem-leaves linear or linear-lanceolate, entire or nearly so.

Lobes of the corolla as long or nearly as long as the tube.

Annual or biennial, with slender spreading branches and few flowers. The corolla rather large and very open 6. *Spreading C.*

Erect, stiff perennial, with long racemes of rather small flowers 5. *Rampion C.*

Lobes of the corolla considerably shorter than the tube 7. *Harebell C.*

Stem-leaves ovate-lanceolate or heart-shaped, and toothed.

Flowers two or more together in the upper axils or in terminal heads or clusters.

Flowers closely sessile, in compact heads . . 1. *Clustered C.*

Flowers shortly stalked, in rather loose clusters . . 2. *Nettle-leaved C.*

Flowers growing singly in the upper axils or in a simple terminal raceme.

Flowers (middle-sized) in a long terminal raceme, with short floral leaves 4. *Creeping C.*

Flowers few and large, the lower ones in the axils
of leaves longer than themselves.

Lower stem-leaves stalked, but tapering at the
base 3. *Giant C.*

Lower stem-leaves stalked, and heart-shaped
at the base 2. *Nettle-leaved C.*

Many species of *Campanula* have long been favourites in our gardens for the beauty of their flowers, amongst which the most common are the *Canterbury-bell* (*C. medium*), the *C. pyramidalis*, *betonicaefolia*, *garganica*, *Carpathica*, *persicifolia*, etc. The latter species (Eng. Bot. Suppl. t. 2773), very widely distributed over the continent of Europe, and northern Asia, and easily maintaining itself when once planted, has been inserted in our Floras, but it does not appear to have anywhere spread permanently beyond our gardens.

1. Clustered Campanula. *Campanula glomerata*, Linn.

(Fig. 609.)

(Eng. Bot. t. 90.)

Rootstock short, more or less creeping. Stem firm, erect, a foot high or rather more, and hairy. Radical and lower leaves stalked; the remainder sessile, broadly lanceolate, clasping the stem by their cordate base, and roughly hairy. Flowers sessile, in small clusters in the upper leaves, the upper ones forming a compact leafy head. Corolla blue, about half an inch long or rather longer. Capsules short and broad, crowned by the narrow leafy teeth of the calyx, and bursting open by small clefts at their base.

In rather dry pastures, throughout continental Europe and Russian Asia, except the extreme north. Extends over the greater part of England, but is absent from some of the western counties as well as from Ireland, and only penetrates into the south-eastern counties of Scotland. *Fl. summer*. In very dry soils it often becomes very much dwarfed.



Fig. 609.

2. Nettle-leaved Campanula. *Campanula Trachelium*,
Linn. (Fig. 610.)

(Eng. Bot. t. 12.)



Fig. 610.

A variable species, sometimes approaching in appearance the smaller specimens of the *giant C.*, sometimes with the upper flowers almost contracted into a head or cluster like the *clustered C.* Lower leaves on long stalks, always broadly heart-shaped and coarsely toothed; the upper ones small and ovate-lanceolate. Flowers large, two or three together in short leafy racemes in the upper axils or at the summit of the stem, or sometimes solitary, as in the *giant C.*; the calyx stiffly hairy, with broadly-lanceolate segments.

Its stations and geographical range are nearly the same as those of the *giant C.*, extending all across Russian Asia, but it appears to be more generally diffused in western Europe. It is also more common in England, but very doubtfully

indigenous in Scotland or Ireland. *Fl. summer.*

3. Giant Campanula. *Campanula latifolia*, Linn.

(Fig. 611.)

(Eng. Bot. t. 302.)

A tall, handsome species, with nearly simple stems; the leaves ovate-lanceolate, pointed and toothed, often 6 inches long and at least 2 inches broad, all narrow at the base, and the lower ones stalked. Flowers large, blue or white, solitary in the axils of the upper leaves, forming a leafy raceme, the uppermost exceeding their leaves. Capsules short, crowned by the long-lanceolate calyx-segments, and opening by short clefts at the base.

In the woods of northern Europe and Russian and central Asia, and extending to the Arctic regions, but becomes rather a mountain plant in southern Europe. Pretty frequent in southern Scotland, and northern England, but apparently shunning the extreme countries at both ends of Great Britain, and a very doubtful native of Ireland. *Fl. summer.*



Fig. 611.

4. **Creeping Campanula.** *Campanula rapunculoides*, Linn.
(Fig. 612.)

(Eng. Bot. t. 1369.)

Rootstock more creeping than in the other species, with a simple erect stem 1 to 2 feet high. Lower leaves on long stalks, and heart-shaped; the upper ones small, ovate-lanceolate. Flowers drooping, not so large as in the last two species, but varying in size; they grow singly in the axils of small floral leaves, forming long, terminal, simple racemes. Capsules nearly globular, crowned by the linear or narrow-lanceolate lobes of the calyx, and opening by small clefts at the base.

In open woods, in central and southern Europe and western Asia. Having been early cultivated in gardens, and when once planted in a genial soil becoming often difficult of extirpation, it is doubtful how far it may be indigenous in the more northern stations given for it. In Britain, admitted as a native of a few localities distantly scattered over England and Scotland, but evidently with much doubt. *Fl. summer.*



Fig. 612.

5. **Rampion Campanula.** *Campanula Rapunculus*, Linn.
(Fig. 613.)

(Eng. Bot. t. 283. *Ramps* or *Garden Rampion*.)



Fig. 613.

An erect, stiff, but rather slender perennial, more or less covered with stiff white hairs, which almost disappear when cultivated. Radical leaves oblong or ovate, on long stalks, and slightly crenate; the stem-leaves narrow and mostly entire. Flowers small, on short peduncles, forming long, simple, or slightly branched terminal racemes; the corolla divided to about the middle into 5 lanceolate segments, but not near so large nor so open as in the *spreading C.* Capsule short and erect, opening in small lateral clefts close under the narrow-linear segments of the calyx.

On banks, roadsides, and open pastures, in central and southern Europe to the Caucasus, becoming scarcer further north, and in many places probably only escaped from cultivation. In Britain, it used to be commonly raised in kitchen-gardens for its tuberous roots, and it is uncertain whether in those localities in southern England, where it is now undoubtedly wild, it should be held as a true native or merely established through cultivation. *Fl. summer.*

6. **Spreading Campanula.** *Campanula patula*, Linn.
(Fig. 614.)

(Eng. Bot. t. 42.)

An erect but rather slender annual or biennial, about a foot high, and slightly hairy, with spreading branches. Radical leaves obovate or oblong, and stalked; the stem ones few, narrow-lanceolate or linear, nearly entire. Flowers few, rather larger than in the *Harebell C.*, in a spreading panicle; the corolla much more open, of a more purplish colour, and divided to the middle into 5 broad, pointed lobes. Capsule obconical, erect, and opening in short clefts close under the long, linear segments of the calyx.

Under hedges, on banks, and in bushy pastures, over the whole of Europe, except the extreme north, extending to the Caucasus and to the Ural. In Britain, chiefly confined to the central and southern counties of England. *Fl. summer.*



Fig. 614.

7. Harebell Campanula. *Campanula rotundifolia*, Linn.
(Fig. 615.)

(Eng. Bot. t. 866.)

A perennial, with a slender, creeping rootstock, often very intricate; the radical leaves, which mostly die away at the time of flowering, orbicular or heart-shaped; those of the stem all narrow-lanceolate or linear, and entire. Stems ascending or erect, 6 to 18 inches high, often branched, with a few elegantly drooping blue flowers, in a loose raceme or panicle, or sometimes solitary. Corolla bell-shaped, with 5 broad lobes much shorter than the entire part. Capsule ovoid or globular, pendulous, and opening in short clefts close to the base.

In hilly pastures, on heaths, banks, and roadsides, the commonest species in Europe and Russian Asia, from the Mediterranean to the Arctic Circle, and ascending to great elevations. Abundant all over Britain. *Fl. summer and autumn.*



Fig. 615.

8. Ivy Campanula. *Campanula hederacea*, Linn.

(Fig. 616.)

(Eng. Bot. t. 73.)



Fig. 616.

A little, graceful, prostrate perennial, with very slender, thread-like branches, and small, delicate leaves, mostly orbicular or broadly heart-shaped, with a few broad, angular teeth. Flowers on long, filiform peduncles, drooping in the bud, nearly erect when fully out, and often drooping again as the fruit ripens. Corolla not half an inch long, narrow-bellshaped, of a delicate pale-bluish purple. Capsule almost globular, opening in 3 valves at the top between the calycine teeth, on which account this species is placed by modern botanists in the genus *Wahlenbergia*.

In moist, shady pastures, and woods, chiefly along rills and banks. Abundant in the extreme west of Europe, extending through central France, eastward to the Rhine. In Britain, common in Ireland and western England, as far north as the Isle of Man, and more sparingly in the east, from Sussex in the south to Yorkshire in the north. *Fl.* summer and autumn.

9. Corn Campanula. *Campanula hybrida*, Linn. (Fig. 617.)

(Eng. Bot. t. 375.)



Fig. 617.

A nearly simple annual, erect or decumbent, branched at the base, 6 to 8 inches high, and rather hairy. Leaves oblong, much waved at the edges. Flowers sessile in the axils of the upper leaves, remarkable for their long, narrow, triangular ovary and capsule, crowned by the linear or oblong leafy segments of the calyx. Corolla blue, much shorter than the calyx, and very open. The capsule opens by short clefts close under the segments of the calyx. Seeds very bright and shining.

A cornfield weed, apparently of southern origin, but now widely spread over a great part of Europe. Not uncommon

in the cornfields of central and southern England, and appears occasionally in the north and in some parts of Scotland, but has not been found in Ireland. *Fl. with the corn.* The *Venus's looking-glass* of our gardens (*C. speculum*) is a nearly allied species, common on the Continent, with the same long capsule, but a much larger corolla, flat, and exceeding the lobes of the calyx. These plants are now usually considered as forming a distinct genus, under the name of *Specularia*.

XLII. THE HEATH FAMILY. ERICACEÆ.

Shrubs, sometimes very low, creeping, and almost herbaceous, or occasionally growing into small trees, with entire or toothed undivided leaves, and flowers usually drooping, either solitary or in small clusters or racemes in the axils of the leaves, or forming short terminal, leafy racemes. Calyx of 4 or 5 divisions, either free or with a tube adhering to the ovary. Corolla inferior or superior, usually ovoid or globular, sometimes small and campanulate with 4 or 5 lobes, or (in the two last anomalous genera) with 4 or 5 nearly distinct petals. Stamens twice as many, or rarely the same in number as the lobes of the corolla, and inserted within the corolla but distinct from it; anthers opening at the top with two pores, or (in *Monotropa*) with transverse valves. Ovary having usually as many (rarely apparently twice as many) cells as the lobes of the corolla. Fruit a capsule or berry, with one or several seeds in each cell; the seeds very small, with a fleshy albumen.

A large Order, widely spread over the whole world (excepting Australia), especially in the temperate and colder regions, but not uncommon also in hilly districts within the tropics. It is distinguished from all British Monopetals, except *Campanulaceæ*, by the insertion of the stamens, and from the latter Order by the shrubby habit, the shape of the flower, and especially by the anthers opening in 2 small terminal pores.

Calyx-tube adherent. Corolla superior. Leaves alternate,
often toothed 1. VACCINIUM.

Sepals free. Corolla inferior.

Undershrubs shrubs or trees. Corolla lobed.

Fruit a berry. Leaves alternate, often toothed.

Tall shrub, or tree. Cells of the ovary with several
ovules in each 2. ARBUTUS.

Low, creeping shrubs. One ovule in each cell of the
ovary 3. BEARBERRY.

Fruit a dry capsule. Leaves usually small and entire.

Stamens 5. Leaves very small, opposite . . . 5. LOISELEURIA.

Stamens 8.

Corolla deciduous. Leaves scattered, white underneath 6. MENZIESIA.

Corolla remaining till the capsule is ripe. Leaves opposite or whorled 7. HEATH.

Stamens 10. Leaves alternate.

Capsule opening by slits in the middle of the cells.

Flowers pink 4. ANDROMEDA.

Capsule opening by the splitting of the partitions.

Flowers purplish-blue 6. MENZIESIA.

Herbs. Petals free or nearly so.

Leaves radical or nearly so. Scape leafless . . . 8. WINTERGREEN.

Leaves reduced to scales of the same colour as the stem 9. MONOTROPE.

The *Rhododendrons*, *Azaleas*, *Kalmias*, and other genera of our so-called American gardens, belong also to the *Heath* family, which comprises perhaps more ornamental plants than any other Order. The *Epacris*es and allied plants which flower in such perfection in our greenhouses in early spring, form a closely allied family, which replaces the *Heaths* in Australia.

I. VACCINIUM. VACCINIUM.

Low shrubs, with alternate leaves, and flowers usually solitary, or only two or three together. Calyx with a short tube adhering to the ovary, and 4 or 5 small teeth. Corolla superior, with as many teeth or divisions. Stamens twice as many. Berry globular, with several seeds (or at any rate, several ovules, in the young state) in each cell.

A numerous genus in mountainous districts or boggy heaths, over a great part of the globe, now usually considered as forming a distinct family, separated from that of the *Heaths* on account of the inferior ovary; but this character, however important it may be in many cases, is, in this instance, very artificial. *Vaccinium* has also been divided into numerous genera, chiefly according to the form of the corolla; and many of them, including the brilliant *Thibaudias*, occasionally grown in our stoves, must undoubtedly be adopted as such, although their characters are as yet far from being settled.

Stems erect or decumbent at the base. Leaves deciduous.

Anthers with 2 little awns or points on the back.

Berries black or bluish.

Branches angular. Leaves toothed 1. *Bilberry* V.

Branches terete. Leaves entire 2. *Bog* V.

Stems prostrate or creeping. Leaves evergreen. Anthers without awns. Berries red.

- Leaves obovate, firm. Corolla campanulate 3. *Cowberry V.*
 Leaves small, ovate or lanceolate. Stem slender. Corolla
 spreading, with reflexed lobes 4. *Cranberry V.*

1. **Bilberry *Vaccinium Myrtillus*, Linn.**
 (Fig. 618.)

(Eng. Bot. t. 456. *Bilberry. Whortleberry.*)

A small, glabrous shrub, with numerous erect or spreading, angular, green branches, 6 inches to a foot high, or rather more. Leaves deciduous, ovate, often slightly cordate at the base, seldom an inch long, bordered with small teeth, and scarcely stalked. Flowers nearly globular, of a pale greenish-white, with a tinge of red, growing singly on short recurved pedicels in the axils of the leaves. Berry globular, nearly black, covered with a glaucous bloom, and crowned by the short teeth of the calyx.

In mountain heaths and woods, in northern and central Europe and Russian Asia, restricted to great mountain-ranges in southern Europe, and usually occupies large tracts of land. Common in Britain, with the exception of eastern England. *Fl. spring.*

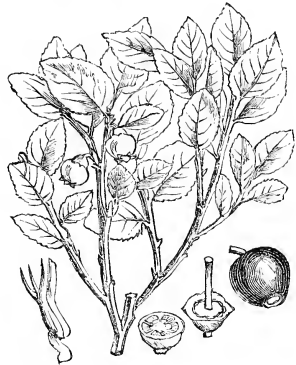


Fig. 618.

2. **Bog *Vaccinium*. *Vaccinium uliginosum*, Linn. (Fig. 619.)**
 (Eng. Bot. t. 581.)

A smaller plant, more woody and branched than the *Bilberry V.*, with smaller, obovate or orbicular leaves, quite entire, but thin, deciduous, and much veined, as in that species. The branches are cylindrical, or have scarcely perceptible angles, and are much shorter and not so straight. Flowers rather smaller; the berries very similar in size and colour.

In mountain heaths and bogs, in northern and central Europe, Russian Asia, and northern America; generally restricted to greater elevations than the



Fig. 619.

Bilberry V. Common in the Highlands of Scotland, and descends to the northern counties of England, but not recorded from Ireland. *Fl. spring.*

3. Cowberry *Vaccinium*. *Vaccinium Vitis-idæa*, Linn.
(Fig. 620.)

(Eng. Bot. t. 598. *Red Whortleberry. Cowberry.*)



Fig. 620.

Stems much branched, procumbent, and straggling, with numerous evergreen, obovate or oblong leaves, like those of the *Box*. Flowers several together, in short, dense, terminal, drooping racemes. Corolla of a pale flesh-colour, campanulate, with spreading but not reflexed lobes. Berries much resembling those of the *Cranberry*, for which they are sometimes sold.

In dry, rocky moors, and heaths, and open woods, in northern and central Europe, Russian Asia, and North America, becoming a mountain plant in southern Europe. In Britain, spread over Scotland, northern and western England, Wales, and Ireland. *Fl. early summer.*

4. Cranberry *Vaccinium*. *Vaccinium Oxycoccus*, Linn.
(Fig. 621.)

(Eng. Bot. t. 319. *Cranberry.*)

Stem creeping, and very much more slender and wiry than in any of the preceding species. Leaves small, evergreen, ovate or lanceolate, with their edges rolled back, and the under side very glaucous. Flowers drooping, on long, slender peduncles, which have a pair of small bracts below the middle. Corolla deeply divided into 4 lobes, which are very spreading or turned back, exposing the stamens. Berry globular, red, crowned by the 4 short teeth of the calyx.

In peat-bogs, in northern Europe, Asia, and America, and in the high mountain-ranges of central Europe, but not recorded from the

Caucasus. In Britain, thinly scattered though widely diffused through the chief part of our islands, but now rendered much less plentiful than formerly from the drainage and enclosure of waste lands. *Fl. summer*. It is often considered as forming a distinct genus on account of the shape of the corolla.



Fig. 621.

II. **ARBUTUS.** ARBUTUS.

Shrubs or trees, with alternate, entire or toothed, evergreen leaves; the flowers in terminal panicles. Calyx inferior, of 5 small sepals. Corolla ovoid, enclosing the 10 stamens. Ovary of 5 cells, with several ovules in each. Fruit an indehiscent berry.

A small genus, chiefly American, with 2 or 3 Asiatic species, one of which extends into Europe.

1. **Common Arbutus.** *Arbutus Unedo*, Linn. (Fig. 622.)

(Eng. Bot. t. 2377. *Arbutus*. *Strawberry-tree*.)

An evergreen shrub or bushy tree, the young shoots often hairy, but otherwise glabrous. Leaves shortly stalked, ovate or oblong-lanceolate, toothed, and shining on the upper side, 2 to 3 inches long. Flowers in small, drooping terminal panicles, scarcely so long as the leaves, of a greenish white, often tinged with pink. Berry red, globular, and granulated, so as at a distance to resemble a strawberry, but dry and without flavour.

Frequent in hilly districts of southern Europe, extending eastward almost



Fig. 622.

if not quite to the Caucasus, and ascending along the western coast of Europe to Ireland, where it is abundant about the lakes of Killarney, and near Glengariff, but not indigenous to any part of Great Britain. *Fl. autumn.*

The *A. Andrachne*, from western Asia, and *A. procera*, from north-west America, are often planted in our gardens.

III. BEARBERRY. ARCTOSTAPHYLOS.

Low, creeping, or straggling shrubs, with alternate, entire or toothed leaves, and rather small flowers, 2 or 3 together, in short terminal racemes. Calyx, corolla, and stamens of *Arbutus*, but the ovary has but one ovule in each cell. Fruit a berry, with 5 or fewer seeds.

A considerable American genus, with a very few Asiatic and European species.

Leaves evergreen, shining, and Box-like 1. *Common B.*
 Leaves strongly veined, withering away at the end of the year 2. *Black B.*

1. Common Bearberry. *Arctostaphylos Uva-ursi*, Spreng. (Fig. 623.)

(*Arbutus*, Eng. Bot. t. 714.)



Fig. 623.

The plant has some resemblance to the *Cowberry*, but it is at once known by the free ovary and fruit, the sepals being at the base of the berry, not crowning it. The procumbent stems form large masses, with numerous shining, evergreen, obovate or oblong leaves, quite entire, and seldom an inch long. Flowers much like those of the *Arbutus*, but smaller, from 4 to 6 together, in compact, drooping terminal racemes. Berries globular, of a bright red, smooth and shining.

On rather dry, heathy, or rocky hills, often covering considerable tracts of ground, and extending over a great part of central and northern Europe, Russian Asia, and Northern America, to the Arctic Circle. In Britain, confined to Scotland, northern England, and Ireland. *Fl. spring.*

2. **Black Bearberry.** *Arctostaphylos alpina*, Spreng.
(Fig. 624.)

(*Arbutus*, Eng. Bot. t. 2030.)

A low, creeping shrub, with shorter and more herbaceous branches than those of the last species; the leaves rather narrower, and very different in consistence, being thin, strongly veined, toothed at the top, and withering away at the end of the season. Young shoots surrounded by the scales of the leaf-buds, which remain long persistent. Flowers small, usually 2 or 3 together, on short, drooping pedicels.

A high alpine or arctic plant, common in the mountains of northern Europe, Asia, and America, and at high altitudes in the more central chains of the two former continents. In Britain, only in the northern Highlands of Scotland, including Ben Nevis. *Fl. spring.*



Fig. 624.

IV. **ANDROMEDA.** ANDROMEDA.

Small shrubs or herb-like undershrubs, chiefly growing in peat-bogs, with the flowers of an *Arbutus*, but a dry capsular fruit opening in as many entire valves as it has cells, by slits placed in the middle of the cells, not by the splitting of the partitions as in *Menziesia*, each cell containing several seeds.

A small genus, limited by some modern botanists to the single British species, but usually extended so as to comprise several other North American, as well as Asiatic and European species.

1. **Marsh Andromeda.** *Andromeda polifolia*, Linn.
(Fig. 625.)

(Eng. Bot. t. 713.)

A low, branching, herb-like shrub, seldom above 6 inches high, and quite glabrous. Leaves alternate, $\frac{1}{2}$ to 1 inch long, oblong-lanceolate,



Fig. 625.

evergreen, with their edges rolled back, and very glaucous underneath. Flowers on rather long pedicels, in short, terminal racemes or clusters; the calyx small, deeply 5-lobed; the corolla pale-pink, ovoid, enclosing the 10 stamens.

In peat-bogs in northern Europe, Asia, and America, to the Arctic regions, and in the great mountain-chains of central Europe. In Britain, confined to central and northern England, southern Scotland, and Ireland, but absent from the Scotch Highlands, where the plants of similar Continental distribution are usually found. *Fl. all summer.*

V. LOISELEURIA. LOISELEURIA.

A low, trailing shrub, with small, opposite leaves. Sepals 5. Corolla campanulate, 5-lobed. Capsule free, with 2 or 3 cells, opening in as many valves by the splitting of the partitions, and containing several seeds.

The single species of which this genus consists, was included by Linnæus among his *Azaleas*, and some botanists retain that name for it, proposing to give that of *Anthodendron* to the showy shrubs so well known as *Azaleas* in our American gardens, but such a change would entail great useless confusion in synonymy, and the name of *Loiseleuria* is now generally adopted, at least by Continental botanists.

1. Trailing Loiseleuria. *Loiseleuria procumbens*, Desv. (Fig. 626.)

(*Azalea*, Eng. Bot. t. 865.)

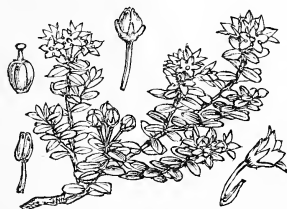


Fig. 626.

Leaves numerous, evergreen, only 2 or 3 lines long, ovate or oblong, shining on their upper side, with the edges rolled back. Flowers small, and rose-coloured, in short terminal clusters. Valves of the capsule usually shortly split at the top.

On mountain moors, in northern and Arctic Europe, Asia and America, and

in the high alpine chains of central Europe. In Britain only in the Scotch Highlands. *Fl. spring.*

VI. **MENZIESIA.** MENZIESIA.

Heath-like, low shrubs, with scattered leaves, and blue or pink flowers, in terminal racemes. Sepals 4 or 5. Corolla deciduous, ovoid, with 4 or 5 short lobes. Stamens 8 or 10. Capsule free, with 4 or 5 cells, opening in as many valves by the splitting of the partitions.

A small northern and west European genus, artificially distinguished from *Andromeda* by the manner in which the capsule opens, from *Heath* by the deciduous corolla, from *Loiseleuria* by the number of stamens. It has been divided by modern botanists into almost as many genera as there are species.

Flowers pink, with 4 lobes. Leaves white underneath . 1. *St. Dabeoc's M.*
Flowers blue, with 5 lobes. Leaves green on both sides . 2. *Blue M.*

1. **St. Dabeoc's Menziesia.** *Menziesia polifolia*, Sm.

(Fig. 627.)

(*Erica Dabeoci*, Eng. Bot. t. 35. *St. Dabeoc's Heath.*)

A low shrub, rather straggling at the base, with ascending flowering branches, clothed with short, rather viscid hairs. Leaves small, the lower ones ovate, the upper ones narrow, all green above, and very white underneath. Flowers very elegant, nearly 6 lines long, pink or sometimes white, drooping from short pedicels, in a loose terminal raceme. Corolla with 4 very short, spreading lobes. Stamens 8. Capsule 4-celled.

A strictly west European plant; common on the heathy wastes of the Asturias and south-western France, and extending up to Cunnemara in Ireland, but unknown in Great Britain. *Fl. summer.*

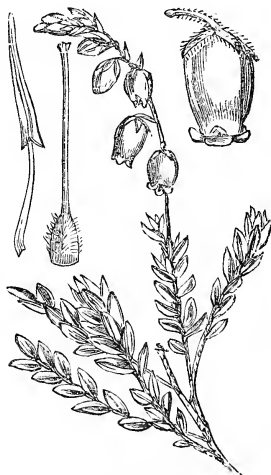


Fig. 627.

2. Blue Menziesia. *Menziesia cœrulea*, Sm. (Fig. 628.)

(Eng. Bot. t. 2469.)

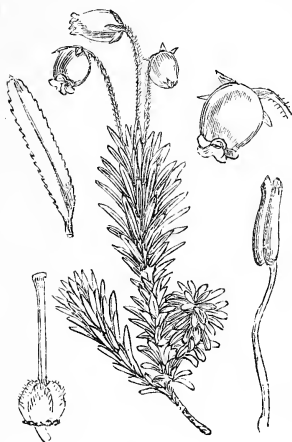


Fig. 628.

A small, much-branched shrub. Leaves evergreen, crowded, linear, green on both sides, and bordered with minute, glandular teeth, scarcely visible without a magnifying-glass. Flowers of a purplish blue, on long pedicels, clustered three or four together, in very short terminal racemes or umbels. Corolla 4 or 5 lines long, with 5 very short lobes. Stamens 10. Capsule 5-celled.

On mountain heaths, in northern and Arctic Europe, Asia and America, and in the Pyrenees. In Britain only on the mountain called the Sow of Athol, in Perthshire, where it is becoming exceedingly rare, if not already extinct. *Fl. summer.*

VII. **HEATH.** ERICA.

Much branched shrubs, usually low, but in some species attaining 8 or 10 feet, with small, entire leaves, usually in whorls of 3 or 4, but sometimes opposite or scattered, and almost always rolled back on their edges. Flowers either axillary or in short terminal racemes or clusters, mostly drooping. Sepals 4. Corolla ovoid, globular, or campanulate (in some exotic species tubular), more or less 4-lobed, and persisting round the capsule till its maturity. Stamens 8. Capsule free, with 4 cells, opening in as many or twice as many valves, each cell with several seeds.

A genus of about 400 genuine species, besides the innumerable hybrids and varieties raised in our gardens. Its geographical range is eminently Atlantic. The greater number of species come from southwestern Africa, where they extend but very little way to the eastward. In Europe also *Heaths* are strictly western, with the exception of two or three species extending a considerable way eastward along the sandy wastes of northern Europe, or round the Mediterranean to the frontiers of Asia. The genus is otherwise unknown in Asia, America or Australia.

- Corolla shorter than the calyx. Leaves very short, all opposite 1. *Common H.*
- Corolla longer than the calyx. Leaves in threes or in fours.
- Anthers included within the corolla.
- Corolla nearly $\frac{1}{2}$ inch long, oblique at the mouth.
- Anthers without awns 4. *Ciliated H.*
- Corolla about $\frac{1}{4}$ inch long, straight at the mouth.
- Anthers with two awns, or little appendages at the insertion of the filament.
- Leaves 3 in a whorl. Flowers numerous, in oblong or elongated racemes 2. *Scotch H.*
- Leaves 4 in a whorl. Flowers few, in terminal clusters or umbels 3. *Cross-leaved H.*
- Anthers protruding from the corolla, without awns or appendages.
- Corolla campanulate or nearly globular. Sepals short. Anthers short, with slender filaments 6. *Cornish H.*
- Corolla narrow ovoid. Sepals linear. Anthers oblong, with flattened filaments 5. *Mediterranean H.*

1. Common Heath. *Erica vulgaris*, Linn. (Fig. 629.)

(Eng. Bot. t. 1013. *Calluna vulgaris*, Brit. Fl. *Heath* or *Ling*.)

A low, straggling shrub, seldom above a foot high. Leaves very small and short, opposite, a little prolonged at the base below their insertion, and on the young shoots closely imbricated in four rows. Flowers small, of a purplish-pink, often very pale or even white, on short pedicels along the upper branches, forming irregular, leafy racemes. Calyx coloured like the corolla, with 4 small bracts at its base, often called an outer calyx. Corolla concealed by the calyx, deeply 4-lobed. Capsule opening by slits opposite the partitions, not in the middle of the cells, as in most other *Heaths*.

The most widely distributed of all the *Heaths*, extending over the whole of central and northern Europe to the Arctic Circle, eastward to the Ural, and westward to the Atlantic, from Labrador down to the Azores. In Britain very abundant. *Fl. summer.*

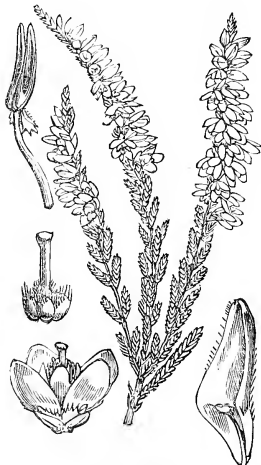


Fig. 629.

It varies, either quite glabrous or more or less downy, or even hairy. It is now generally considered as a distinct genus under the name of *Calluna*.

2. Scotch Heath. *Erica cinerea*, Linn. (Fig. 630.)

(Eng. Bot. t. 1015. *Scotch Heather*.)



Fig. 630.

Usually more bushy, and rather taller than the *common H.*, the leaves linear, finer and more pointed than in any of our other *Heaths*, and usually 3 in a whorl, with clusters of small leaves in their axils. Flowers numerous, of a reddish purple, in very showy, dense terminal racemes. Sepals small and narrow. Corolla ovoid, about 3 lines long, straight at the mouth, with 4 very small lobes or teeth. Stamens enclosed in the corolla, with small, toothed appendages at the insertion of the anther on the filament.

Common in western Europe, from southern Spain to Norway. Ranges over nearly the whole of Britain, covering immense tracts of country on the Scotch, Irish, Welsh, and some of the western English moors. *Fl. summer and autumn.*

3. Cross-leaved Heath. *Erica Tetralix*, Linn. (Fig. 631.)

(Eng. Bot. t. 1014.)

Generally a lower plant than the *Scotch H.*, bushy at the base, with rather short, erect flowering branches; the leaves in fours, shorter and less pointed than in that species, and ciliate with short stiff hairs, besides a short, whitish down, which often clothes the branches and upper leaves. Flowers about the size of those of the *Scotch H.*, but more pink in colour, and forming little terminal clusters or close umbels. Appendages to the anthers entire, awn-like, and often nearly as long as the anthers themselves.

A strictly western species in southern Europe, but in northern Europe extends over Sweden and northern Germany to Courland and Livonia, but never so gregarious as the *Scotch H.* Ranges all over Britain, and very common in the west. *Fl. summer, rather late.* A

very marked variety, with shorter and broader leaves of a darker green, from Cunnemara, in Ireland, and also from the Asturias, has been distinguished under the name of *E. Mackaiana* (Eng. Bot. Suppl. t. 2900) as a species, and was formerly adopted as such by myself, but the numerous intermediate specimens I have since seen, induce me now to consider it as a mere variety. Intermediate forms between this and the following species, observed near Truro, in Cornwall, are believed to be natural hybrids.



Fig. 631.

4. Ciliated Heath. *Erica ciliaris*, Linn. (Fig. 632.)

(Eng. Bot. Suppl. t. 2618.)

A very handsome species, readily known by its raceme of highly-coloured rosy flowers, of the size of those of *St. Dabeoc's Menziesia*. It is a straggling shrub, ciliated with short stiff hairs. Leaves 3 in a whorl, ovate. Flowers in short pedicels in the axils of the upper leaves. Sepals small and ciliate. Corolla about 5 lines long, with a small, very oblique, 4-lobed mouth. Stamens enclosed in the corolla, without any appendages to the anthers.

A strictly western species, extending from Spain and Portugal to the west of Ireland, and not penetrating far inland. Also found in Cornwall, and near Corfe Castle, in Dorsetshire. *Fl.* early summer.

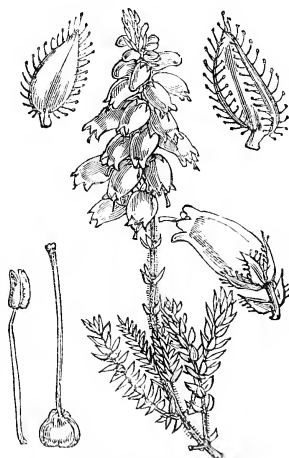


Fig. 632.

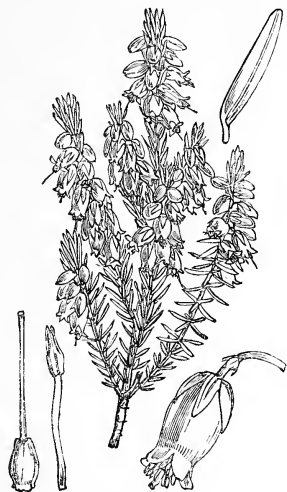
5. Mediterranean Heath. *Erica carnea*, Linn. (Fig. 633.)(*E. mediterranea*, Eng. Bot. Suppl. t. 2774.)

Fig. 633.

Leaves in fours or rarely in threes, linear but obtuse, firmer and thicker than in the *Scotch H.* Flowers axillary, forming leafy racemes either terminal or below the ends of the branches. Sepals linear-lanceolate and coloured. Corolla narrow-ovoid, about 3 lines long, of a reddish flesh-colour. Anthers protruding slightly from the mouth of the corolla, oblong, inserted by their lower ends on somewhat flattened filaments, without any appendages.

The geographical range is different from that of most *Heaths*, being scattered here and there on the lower hills along the great central range of European mountains, from Switzerland to the Balkan, where it is usually, but not always, a rather low, almost straggling shrub. Descending to the shores of the

Atlantic it is there more erect, with rather smaller flowers, a form considered by many as a distinct species, under the name of *E. mediterranea*. It reappears in some of the western counties of Ireland in a form intermediate between the extreme Continental varieties. It is not wild in Great Britain, but frequently cultivated in our gardens. *Fl. early spring.*

6. Cornish Heath. *Erica vagans*, Linn. (Fig. 634.)

(Eng. Bot. t. 3.)

A rather low species, the leaves linear, in fours or sometimes in threes, as in the *Mediterranean H.* Flowers very numerous, axillary on slender pedicels, forming terminal, oblong or elongated leafy racemes. Sepals short and obtuse. Corolla pink or almost white, rather small, campanulate when it first expands, but becoming nearly globular. Anthers very small, appearing double, protruding beyond the corolla upon slender filaments, without appendages.

A gregarious species, often occupying large tracts of open country, like the *Scotch H.*; ranging all round the Mediterranean from Spain to Greece, Turkey, and Egypt, and ascending along the Atlantic to Cornwall and the south coast of Ireland, but never penetrating very far inland. *Fl.* summer, rather early.

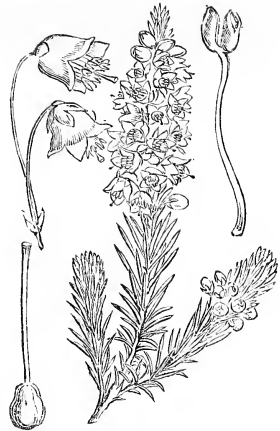


Fig. 634.

VIII. WINTERGREEN. PYROLA.

Low herbs, with a slender, shortly creeping stock; orbicular or ovate, nearly radical leaves; and white or greenish, drooping flowers, either solitary or several in a short raceme, on leafless, erect peduncles. Sepals 5, small. Petals 5, distinct or slightly joined at the base, forming at first a spreading corolla, which persists round the capsule, assuming a globular shape. Stamens 10. Capsule 5-celled, opening by slits in the middle of the cells.

A small genus, confined to the northern hemisphere both in the new and the old world; allied to the *Heaths* in all essential characters, although so different in habit and foliage. It has been divided by modern botanists into almost as many genera as it has species.

Flowers solitary 1. *One-flowered W.*

Flowers several in a raceme.

Leaves ovate, pointed. Flowers small, in a close one-sided raceme 5. *Serrated W.*

Leaves ovate or rounded, obtuse. Flowers in a loose raceme, usually few.

Style much longer than the corolla, and curved . . . 2. *Larger W.*

Style longer than the corolla, and straight . . . 3. *Intermediate W.*

Style not longer than the corolla 4. *Common W.*

1. One-flowered Wintergreen. *Pyrola uniflora*, Linn.
(Fig. 635.)

(Eng. Bot. t. 146.)



Fig. 635.

Leaves of the *common W.*, but rather smaller. Flower rather large, always solitary on the peduncle, drooping, nearly white, and very fragrant; the petals ovate, slightly connected at the base. The pores of the anthers form little protruding tubes much more prominent than in the other species, although they are sometimes observable even in the *common W.* Style nearly straight, with a broad, 5-lobed stigma.

In woods, in northern and Arctic Europe, Asia, and America, and along the high mountain-ranges of central Europe. Very scarce in Scotland, and unknown in England or Ireland. *Fl. summer.*

2. Larger Wintergreen. *Pyrola rotundifolia*, Linn.
(Fig. 636.)

(Eng. Bot. t. 213.)



Fig. 636.

A larger plant than the *common W.*, with larger and whiter flowers, and the petals more spreading, but chiefly distinguished from it by the long, protruding, much curved style, usually at least twice as long as the capsule, with a much smaller stigma, with short, erect lobes.

In similar situations and with nearly the same range as the *common W.*; extending further into central Asia, but not so frequent in Europe, and rare in Britain. *Fl. summer.*

3. Intermediate Wintergreen. *Pyrola media*, Swartz. (Fig. 637.)

(Eng. Bot. t. 1945.)

Perhaps a mere variety of the *common W.*, and sometimes passing almost into the *larger W.* It differs from the former chiefly by the style, which is considerably longer, although nearly straight, and never so curved as in the *larger W.* The size of the flower is variable.

The geographical range and stations are the same as those of the *common W.*, but it is not near so common.



Fig. 637.

4. Common Wintergreen. *Pyrola minor*, Linn. (Fig. 638.)

(Eng. Bot. t. 158 ; and *P. rosea*, Eng. Bot. t. 2543.)

Stock perennial, slightly creeping, retaining a few leaves during the winter intermixed with scales produced at the base of each year's shoot. Leaves on rather long stalks, collected three or four together in one or two tufts at the top of the stock, broadly ovate or orbicular, rather thick, entire or slightly crenate, with a minute tooth or gland in each notch, scarcely visible without a glass. Peduncle erect, from 4 or 5 inches to twice that height, leafless or with one or two small scales. Flowers drooping, in a short, loose raceme, not turned to one side as in the following species, each one in the axil of a small, narrow bract. Sepals short and broad. Petals ovate or orbicular, quite free, but concave and closing over the sta-



Fig. 638.

mens, usually of a pale pink. Stamens shorter than the corolla. Style scarcely protruding or even shorter than the corolla, straight or nearly so, with a broad, 5-lobed, spreading stigma.

In woods and moist shady places, in Europe, northern Asia, and the extreme north of America, becoming a mountain plant in southern Europe and the Caucasus. Frequent in Scotland, northern England, and Ireland, more local in southern England. *Fl. summer.*

5. Serrated Wintergreen. *Pyrola secunda*, Linn. (Fig. 639.)

(Eng. Bot. t. 517.)



Fig. 639.

Leaves ovate, more pointed, and often more distinctly toothed and more prominently veined than in the *common W.* Flowers smaller, and more numerous and crowded, and all remarkably turned to one side. Sepals very small. Petals free, of a greenish-white. Style long and nearly straight.

The geographical range is nearly that of the *common W.*, but it is more local, and generally more northern or more alpine, being rarely found in central and southern Europe out of the higher mountain-ranges. In Britain, only in Scotland and northern England, and very rarely in Ireland. *Fl. summer.*

IX. **MONOTROPE.** MONOTROPA.

Simple, erect, rather succulent herbs, of a pale-brown or yellowish colour, leafless with the exception of small scales of the colour of the stem, resembling *Broomrapes*, and probably parasitical on the roots of trees. Sepals 4 or 5, free or united at the base. Petals as many, free or united at the base. Stamens twice as many. Anthers opening by transverse slits or valves, not by pores as in the rest of the family. Capsule of 4 or 5 cells, opening by slits opposite the middle of the cells. Style single, with a broad terminal stigma.

A genus of very few species, inhabiting the woods of Europe, Asia,

and America, obviously allied to *Wintergreen*, but readily distinguished by the want of green leaves. As in the case of *Wintergreen*, it has been divided into almost as many genera as there are species.

1. Common Monotrope. *Monotropa Hypopitys*, Linn.
(Fig. 640.)

(Eng. Bot. t. 69. *Yellow Bird's-nest*.)

Stem about 6 or 8 inches high, often rather downy in the upper part, bearing oblong or ovate concave scales instead of leaves. Flowers few, in a short terminal raceme. Sepals and petals nearly of the same size, ovate or oblong, glabrous or slightly downy inside, persisting round the capsule. Anthers small, on slender filaments, opening by transverse valves. The terminal flower has its parts in fours, the lateral ones in fives. The whole plant is of a pale yellowish-brown colour, turning black in drying.

In Fir, Birch, and Beech woods, in Europe and all across Russian Asia and North America, becoming a mountain plant in southern Europe, but extends neither to high northern latitudes nor to great elevations in the Alps. Scattered over nearly the whole of England, but only found in some of the southern counties of Scotland, and very rare in Ireland. *Fl. summer*.

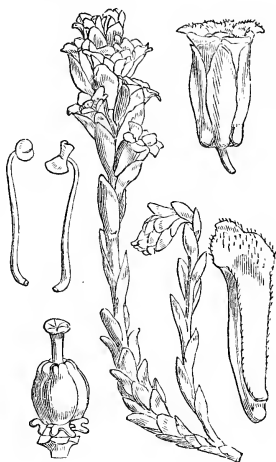


Fig. 640.

XLIII. THE PRIMROSE FAMILY. PRIMULACEÆ.

Herbs, with leaves undivided except when under water; the flowers either axillary or in terminal racemes or umbels. Calyx usually of 5, sometimes 4, 6, or 7 divisions or teeth. Corolla regular, more or less deeply divided into as many lobes or teeth as divisions of the calyx, or rarely wanting. Stamens as many as the lobes of the corolla, inserted in the tube opposite the centre of the lobes, or where there is no corolla, alternating with the lobes of the calyx. Capsule single, 1-celled, containing several seeds

attached to or immersed in a free central placenta, which is often thick and globular. Style single, with a capitate stigma.

A widely-spread family, inhabiting chiefly the northern hemisphere, and especially high mountains, often at very great elevations. A few species reappear in the Antarctic regions, and even within the tropics, but the group is there represented chiefly by the *Myrsinaceæ*, which scarcely differ, except in their arboreous or shrubby growth. Both these families are chiefly distinguished from other regular-flowered *Monopetals* by the stamens being opposite to, not alternate with, the lobes of the corolla. This character requires some care in observing it, especially in those species of *Lysimachia* which have a deeply divided, rotate corolla, and the stamens erect in the centre of the flower.

Aquatic plant, with the leaves all submerged and pinnate,

with linear lobes 1. *HOTTONIA*.

Terrestrial plants, leaves undivided.

Leaves opposite or whorled. Flowers axillary or rarely terminal.

Stamens and divisions of the flower in fours 8. *CENTUNCULE*.

Stamens and divisions of the flower in fives.

No corolla. Calyx pinkish 6. *GLAUX*.

Both calyx and corolla.

Capsule opening at the top. Flowers yellow . . 4. *LYSIMACHIA*.

Capsule opening transversely. Flowers blue or red 7. *PIMPERNEL*.

Leaves alternate or radical, or the upper ones irregularly whorled. Flowers terminal.

Leaves all radical. Flowers solitary or umbellate, on radical peduncles. Tube of the corolla distinct.

Tube of the corolla cylindrical, lobes spreading. No tubers 2. *PRIMROSE*.

Tube of the corolla nearly globular, lobes reflexed.

Rootstock tuberous 3. *CYCLAMEN*.

Stem leafy.

Leaves in one terminal whorl, with a few alternate ones below. Peduncles few, terminal, one-flowered. Corolla rotate 5. *TRIENTALE*.

Leaves all alternate. Flowers small, white, in a terminal raceme 9. *SAMOLE*.

The *Dodecatheon*, or *American Cowslip* of our gardens, belongs also to the *Primrose* family. The allied family of *Myrsinaceæ*, mentioned above, is represented in our planthouses by a species of *Ardisia*.

I. **HOTTONIA.** HOTTONIA.

Aquatic herbs, with submerged, pinnatifid leaves, and flowers in whorls forming a terminal raceme; differing from *Primrose* in the more

deeply divided calyx, and in the capsule, which opens by lateral slits instead of terminal teeth.

Besides our own species, the genus only comprises a single North American one.

1. **Water Hottonia.** *Hottonia palustris*, Linn. (Fig. 641.)

(Eng. Bot. t. 364. *Water Violet.* *Featherfoil.*)

Stock perennial and creeping, with whorled leafy branches entirely submerged; the leaves alternate and deeply pinnatifid, with narrow-linear lobes. From the centre of the whorl a single, erect, leafless flower-stem arises out of the water, bearing at intervals whorls of from 3 to 5 or 6 handsome, pale-purple flowers, on short pedicels, each with a small bract at its base. Calyx of 5 deep, linear divisions. Corolla with a straight tube, rather shorter or scarcely longer than the calyx, and a broad, 5-lobed limb.

In pools and channels, in central and northern Europe, but not extending to the Arctic Circle. Very local in western England and in Ireland, more common in the central and eastern districts, and not found in Scotland. *Fl.* early summer.

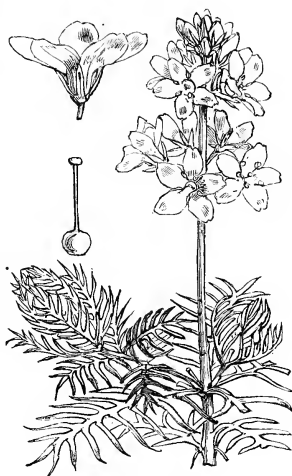


Fig. 641.

II. PRIMROSE. PRIMULA.

Herbs, with radical leaves; the flowers either solitary or in a terminal umbel, on leafless, radical peduncles. Calyx tubular or campanulate, with 5 teeth or lobes not reaching to the base. Corolla with a straight tube, and a spreading, 5-lobed limb, each lobe often notched or 2-cleft. Capsule opening at the top in 5 teeth.

A genus widely spread in Europe and northern and central Asia, containing many alpine species, one of which reappears in Antarctic America.

- Leaves rather large, wrinkled, light green. Lobes of the corolla slightly notched 1. *Common P.*
 Peduncles apparently radical, and one-flowered *Var. a. Primrose.*
 Peduncles bearing an umbel of several flowers.
 Limb of the corolla small and concave *Var. b. Cowslip.*
 Limb of the corolla broad and flat *Var. c. Oxlip.*
 Leaves small, not wrinkled, covered underneath as well as the calyx with a white meal. Corolla small, the lobes deeply notched 2. *Mealy P.*

1. Common Primrose. *Primula veris*, Linn.

Stock perennial and tufted. Leaves ovate or oblong, usually about 3 inches long, of a pale green, slightly toothed and much wrinkled. Calyx tubular, half an inch or rather more in length. Corolla usually yellow or straw-coloured; the tube nearly as long or longer than the calyx; the limb deeply 5-lobed, each lobe shortly notched. Stamens included in the tube.

In meadows, open woods, and hedge-banks, in Europe and Russian Asia. *Fl. spring.* It occurs commonly in three different forms, originally united by Linnæus under one botanical species, but since his days considered by most botanists as so many distinct and constant species, although more recent investigation has shown that Linnæus's views were correct. The *Polyanthuses* of our gardens are cultivated varieties of the same species. The three indigenous races are:—

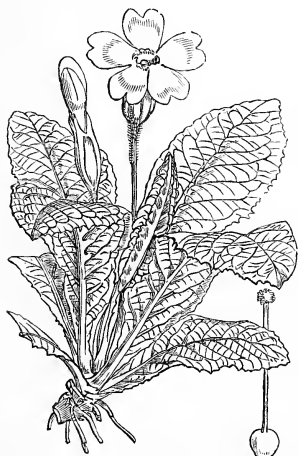


Fig. 642.

a. The *Primrose* (*P. vulgaris*, Eng. Bot. t. 4), Fig. 642. More or less hairy. Peduncles apparently all radical, as long as the leaves, each bearing a single large flower, with a broad flat limb. Calyx-teeth narrow and pointed. If closely examined the peduncles will, however, be seen really to spring from an umbel, of which the common stalk is so short as to be concealed by the base of the leaves.—On hedgebanks and in rather open woods; particularly abundant in Britain, and extends over central Europe and some mountainous districts of southern Europe, wanting in north-eastern Europe, and not recorded from the Altai or from Siberia.

b. The *Cowslip* (*P. veris*, Eng. Bot. t. 5), Fig. 643. Not hairy, but often covered with a minute, pale down. Flower-stalks rising above the leaves, bearing an umbel of flowers. Calyx-teeth usually broad and obtuse. Corolla with a concave or cup-shaped limb, very much smaller than in the *Primrose*, but varying in size.—In rather dry meadows and pastures, abundant over nearly the whole of Europe and Russian Asia to the Caucasus and Altai, and extending much further over southern Europe than the other varieties. Not however an Arctic plant, and, in Britain, not so common in Scotland as in England.

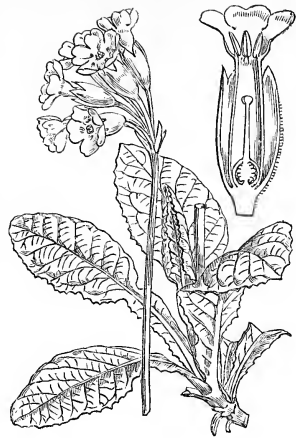


Fig. 643.

c. The *Oxlip* (*P. elatior*, Eng. Bot. t. 513), including all the intermediate forms which have the limb of the corolla broader and flatter than in the *Cowslip*, but the flowers in an umbel raised above the ground, and usually above the leaves, on a common peduncle. Calyx and hairiness partaking sometimes of those of the *Primrose*, sometimes of the *Cowslip*.—Usually in moister and more luxuriant meadows and pastures than the *Cowslip*, in less shady situations than the *Primrose*, but frequently intermixed with either or with both, and passing gradually into one or the other. Geographical range nearly that of the *Cowslip*, but much less abundant, except in some parts of central Europe.

2. Mealy Primrose. *Primula farinosa*, Linn. (Fig. 644.)

(Eng. Bot. t. 6.)

Stock tufted as in the last, but the leaves much smaller, often not an inch long, glabrous above, and usually covered underneath with a white, mealy, minute down, also observable on the peduncle and calyx, and only disappearing on a few very luxuriant specimens grown in the shade. Peduncle much larger than the leaves, with a compact umbel of small, pale-lilac flowers, with a yellow eye; the lobes of the corolla rather narrow, and deeply notched.

In mountain pastures, in all the great mountain-ranges of Europe and Asia, penetrating far into the Arctic regions, and reappearing in Antarctic America. Not uncommon in northern England, and,

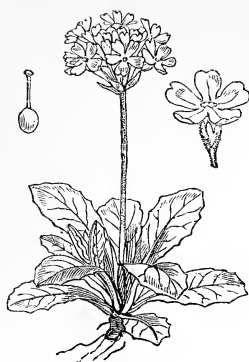


Fig. 644.

although more rare in Scotland, it is found even in the extreme north, but not recorded from Ireland. Specimens from northern Scotland, with broader leaves, and shorter and broader lobes to the corolla, have been distinguished under the name of the *Scotch P.* (*P. scotica*, Eng. Bot. Suppl. t. 2608).

III. CYCLAMEN. CYCLAMEN.

Perennials, with a globular, tuberous rootstock, and radical leaves, and 1-flowered peduncles. Calyx 5-lobed. Corolla with a campanulate tube, and 5 lobes closely reflexed over the calyx. Capsule globular, opening in 5 valves.

A very distinct genus, comprising but few species, from southern Europe and western Asia.

1. Common Cyclamen. *Cyclamen europæum*, Linn.

(Fig. 645.)

(Eng. Bot. t. 548. *C. hederæfolium*, Brit. Fl.)



Fig. 645.

Rootstock forming a tuber, varying from $\frac{1}{2}$ to near 2 inches diameter, according to age and station. Leaves on long stalks, heart-shaped, more or less angular and toothed; often of a purple or violet colour underneath. Peduncles radical, spirally rolled inwards after flowering, so as to bury the capsules in the earth. Flower rather large, white or rose-coloured, fragrant or scentless, drooping from the summit of the peduncle, with the oval or oblong lobes of the corolla turned upwards.

In woods, on banks, and under rocks, in southern Europe and western Asia, and, having been long cultivated in flower-gardens, has established itself in a few localities in southern and eastern England. *Fl. autumn.* In its native country it varies much in foliage, in the precise shape of the orifice of the tube and of the lobes of the corolla, as well as in the time of flowering; and it is believed that two at least of the supposed species founded upon these differences, have been gathered in England apparently wild. Between ten and twenty forms, mostly varieties of the *common C.*, are in cultivation.

IV. **LYSIMACHIA.** LYSIMACHIA.

Perennials, with erect or trailing stems, opposite or whorled leaves; the flowers usually yellow, either solitary on axillary pedicels or collected in terminal or rarely axillary racemes or clusters. Calyx deeply 5-cleft. Corolla rotate or campanulate, deeply 5-lobed. Stamens 5. Capsule opening in 5 or 10 valves. Occasionally the parts of the flower are in sixes instead of fives.

A considerable genus, spread over the northern hemisphere in Europe, Asia, and America.

Stems erect. Peduncles many-flowered.

Leaves ovate-lanceolate. Flowers in short terminal panicles. Lobes of the corolla broad 1. *Common L.*

Leaves lanceolate. Flowers in axillary racemes. Lobes of the corolla narrow and short 2. *Tufted L.*

Stems procumbent or trailing. Peduncles 1-flowered, axillary.

Flowers large, almost campanulate. Calyx-segments broad 3. *Moneywort L.*

Flowers small, rotate. Calyx-segments very narrow . . . 4. *Wood L.*

Besides the above, the *fringed L.* (*L. ciliata*, Eng. Bot. Suppl. t. 2922), a North American species, has been gathered apparently wild in Cumberland and near Dumbarton. It is an erect plant, like the *common L.*, but with fewer flowers on longer pedicels, the corolla more rotate and paler coloured, fringed at the edge, and the stamens free and spreading.

1. **Common Lysimachia.** *Lysimachia vulgaris*, Linn.

(Fig. 646.)

(Eng. Bot. t. 761. *Loosestrife.*)

Stem erect, branched, 2 to 3 feet high, and more or less downy. Leaves usually in whorls of 3 or 4, rather large, broadly lanceolate or



Fig. 646.

nearly ovate. Flowers in short, compound racemes or panicles, in upper axils and at the summit of the branches, forming a terminal, leafy panicle. Segments of the calyx lanceolate and pointed, varying much in breadth, and more or less ciliate on the edges. Corolla yellow, rather campanulate than rotate, deeply divided into 5 broad lobes. Stamens connected at the base into a cup enclosing the ovary.

On shady banks, and along streams, in Europe and Russian Asia, from the Mediterranean and the Caucasus to the Arctic Circle, and reappearing in Australia. Frequent in England and Ireland, but less so in Scotland. *Fl. summer, rather late.* The spotted *L.* (*L. punctata*) is a marked variety of this species, not uncommon in Germany and

south-eastern Europe, and occurring, mixed with the common form, in north-western England and south-western Scotland. It has the pedicels usually 1-flowered in the axils of the stem-leaves, the sepals rather narrower, and the lobes of the corolla fringed with minute glandular hairs; but none of these characters are constant.

2. Tufted Lysimachia. *Lysimachia thyrsiflora*, Linn.

(Fig. 647.)

(Eng. Bot. t. 176.)

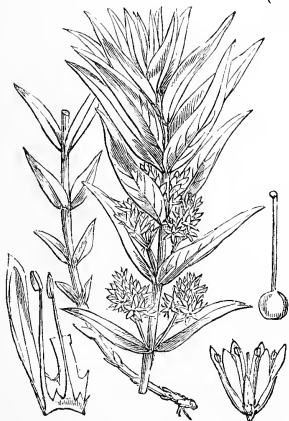


Fig. 647.

Stem erect, simple, 1 to 2 feet high, sometimes slightly downy. Leaves sessile, lanceolate, 2 to 3 inches long. Flowers small and yellow, in dense axillary racemes, more or less pedunculate, but always shorter than the leaves. Sepals and petals narrow, the stamens and styles very prominent, and all the parts of the flower as often in sixes as in fives.

On wet banks, and along streams, in central and northern Europe, and northern Asia and America, extending to the Arctic Circle. Very local in Britain, and chiefly in northern England and central Scotland. *Fl. summer.*

3. **Moneywort** *Lysimachia*. *Lysimachia nummularia*, Linn.
(Fig. 648.)

(Eng. Bot. t. 528.)

Stems prostrate, trailing to the length of 1 or 2 feet, often rooting at the nodes. Leaves opposite, broadly ovate or rounded, usually obtuse, on short stalks. Flowers yellow, large and handsome, on axillary peduncles not so long as the leaves; the divisions of the calyx broadly ovate and pointed; the corolla concave, deeply divided into 5 ovate lobes. Stamens erect in the centre, with the filaments slightly connected at the base.

On banks, under hedges, and in moist pastures, all over Europe, except the extreme north, and eastward to the Caucasus. Common in England, extending apparently to the southern counties of Scotland, rare in Ireland. *Fl. summer and autumn.*



Fig. 648.

4. **Wood** *Lysimachia*. *Lysimachia nemorum*, Linn.
(Fig. 649.)

(Eng. Bot. t. 527.)

A procumbent plant, with the habit and rotate corolla of the *common Pimpernel*, but with the yellow flowers and the capsule of a *Lysimachia*. Stem slender, often rooting at the base, 6 inches to a foot long. Leaves opposite, broadly ovate, on short stalks. Pedicels slender, axillary, rather longer than the leaves, each with a single, rather small flower. Calyx-segments narrow and pointed. Corolla rotate, of a bright yellow. Stamens quite free, with slender filaments. As the capsule ripens, the pedicels roll round, as in the *field Pimpernel*.

In woods and shady places, not uncommon in western Europe, extending far northward in Scandinavia, and eastward through central Europe to Transylvania. Generally distributed over Britain. *Fl. all summer.*



Fig. 649.

V. **TRIENTALE.** TRIENTALIS.

A single species, only distinguished from *Lysimachia* by a somewhat different habit, and by the parts of the flower being usually in sevens instead of in fives, although these numbers are not quite constant.

1. Common Trientale. *Trientalis europæa*, Linn.

(Fig. 650.)

(Eng. Bot. t. 15.)

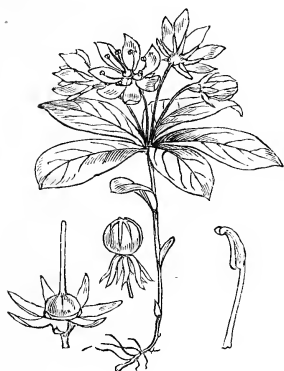


Fig. 650.

Rootstock perennial and slightly creeping. Stems erect, simple, 3 to 6 inches high, bearing at the top a tuft or irregular whorl of 5 or 6 leaves, varying from obovate to lanceolate, usually pointed, the largest near 2 inches long, with 2 or 3 small alternate leaves below the whorl. From the centre of the leaves arise from 1 to 4 slender pedicels, about as long as the leaves, each terminated by a single flower, white or pale-pink, with a yellow ring, rather larger than in the *wood Lysimachia*. Calyx-segments narrow. Corolla rotate. Stamens with slender filaments, and short recurved anthers.

In woods, in northern and Arctic Europe, Asia, and America, reappearing here and there in mountain woods of central Europe. Common in the Scotch Highlands, more rare in the north of England, and unknown in Ireland. *Fl.* early summer.

VI. **GLAUX.** GLAUX.

A single species, distinguished from all *Primulaceæ* by the absence of any real corolla, the coloured campanulate calyx assuming the appearance of one, the stamens alternating with its lobes. Capsule opening in 4 valves.

1. Sea Glaux. *Glaux maritima*, Linn. (Fig. 651.)(Eng. Bot. t. 13. *Sea Milkwort. Black Saltwort.*)

A low, decumbent, branching perennial, glabrous and often slightly succulent, from 3 to 4 or 5 rarely 6 inches high, with a more or less

creeping rootstock. Leaves small, mostly opposite, sessile, ovate or oblong, and entire. Flowers of a pale-pink colour, not 2 lines long. Calyx deeply 5-lobed. Stamens about the same length, with slender filaments and small anthers.

On sands, salt-marshes, and muddy places, near the sea, in Europe, northern Asia, and America, extending to the salt tracts and inland seas of central Asia. Common on the British coasts. *Fl. summer.*



Fig. 651.

VII. PIMPERNEL. ANAGALLIS.

Procumbent or creeping herbs, with opposite leaves, and opposite axillary flowers on slender pedicels. Calyx deeply cleft into 5 narrow segments. Corolla 5-cleft, rotate or campanulate. Stamens 5. Capsule opening transversely by a circular fissure across the middle.

A small genus, chiefly from the Mediterranean region and central Asia, with one South American species.

Annual. Corolla rotate, blue or red 1. *Common P.*

Perennial. Corolla campanulate, of a delicate pale-pink . . . 2. *Bog P.*

1. Common Pimpernel. *Anagallis arvensis*, Linn. (Fig. 652.)

(Eng. Bot. t. 529. *Shepherd's Weather-glass.*)

A neat, much branched, procumbent annual, 6 inches to near a foot long, with opposite, broadly ovate, sessile, and entire leaves. Pedicels considerably longer than the leaves, and rolled back as the capsule ripens. Calyx-divisions pointed. Corolla rotate, usually of a bright red within, but occasionally pale-pink, or white, or bright blue.

A very common weed of cultivation, in cornfields, gardens, waste places, etc., all over Europe and Russian Asia, except the extreme north, and has accom-



Fig. 652.

panied man in his migrations over a great part of the globe. *Fl. the whole season.* The blue variety, by some ranked as a species (*A. cærulea*, Eng. Bot. t. 1823), is as common in central and southern Europe as the red one, but with us it is rare.

2. Bog Pimpernel. *Anagallis tenella*, Linn. (Fig. 653.)

(Eng. Bot. t. 530.)



Fig. 653.

A delicate, slender, creeping perennial, only a few inches long, with very small, orbicular, opposite leaves. Flowers very elegant, of a pale pink, on long, slender pedicels. Segments of the calyx pointed but short. Corolla narrow-campanulate, of a very delicate texture, and deeply 5-cleft. Stamens erect in the centre, with very woolly filaments.

On wet, mossy banks, and bogs, chiefly along rivulets, throughout western Europe, extending eastward to north-western Germany, Tyrol, and here and there round the Mediterranean. Spread over the greater part of Britain but chiefly in the west, from Cornwall to Shetland, and in Ireland. *Fl. summer.*

VIII. **CENTUNCULE.** CENTUNCULUS.

Small, slender annuals, with minute axillary flowers, differing from *Pimpernel* in their alternate leaves, and in the parts of the flower being in fours instead of in fives.

Besides our own species, the genus contains but very few, all from America.

1. Small Centuncule. *Centunculus minimus*, Linn.

(Fig. 654.)

(Eng. Bot. t. 531. *Chaffweed*.)

Stem often under an inch and seldom 3 inches high, branched at the base only. Leaves ovate, 1 to 2 lines long. Flowers almost sessile, shorter than the leaves. Calyx-divisions linear. Corolla pink, very minute. Capsule opening transversely as in *Pimpernel*.

In moist, sandy or gravelly places, ranging over Europe, Russian

Asia, northern and even tropical America, but everywhere thinly scattered or frequently overlooked. Indicated in several localities in England, southern Scotland, and Ireland. *Fl. summer.*



Fig. 654.

IX. **SAMOLE.** SAMOLUS.

Herbs, with alternate leaves and flowers, in terminal racemes. Calyx campanulate, partially adhering to the base of the ovary, with 5 teeth or lobes. Corolla with a short tube, 5 spreading lobes, and a small scale between each lobe, alternating with the stamens. Capsule inferior, opening in 5 valves.

A small genus, belonging, with the exception of our own species, exclusively to the southern hemisphere.

1. **Brookweed Samole.** *Samolus Valerandi*, Linn.

(Fig. 655.)

(Eng. Bot. t. 703. *Brookweed.*)

A glabrous, bright-green annual or perennial, with a tuft of obovate and spreading radical leaves. Flowering stems 3 or 4 inches to near a foot high, slightly branched, bearing a few obovate or oblong leaves, and loose racemes of small white flowers. Pedicels rather long, with a green bract a little above the middle. Capsules small, globular, crowned by the short, broad teeth of the calyx.

Generally diffused over all parts of the world, most abundant in maritime sands and marshes, but in many countries found also far inland. In Britain, almost always near the sea, and chiefly along the west coast. *Fl. summer and autumn.*



Fig. 655.

XLIV. PINGUICULA FAMILY. LENTIBULACEÆ.

Marsh or aquatic plants, with radical or floating leaves (or sometimes none), and very irregular flowers, either solitary or several in a raceme, on leafless, radical or terminal peduncles. Calyx variously divided. Corolla 2-lipped, projecting at the base into a pouch or spur. Stamens 2. Ovary and capsule 1-celled, with several seeds attached to a central placenta.

A family of very few genera, dispersed over the greater part of the globe. Their spurred flowers have a general resemblance to those of *Linaria* in the *Scrophularia* family, next to which they might perhaps be better placed, although the ovary and capsule are those of the *Primrose* family, with which botanists more generally associate them.

Calyx 4- or 5-lobed. Leaves entire, radical 1. BUTTERWORT.

Calyx 2-lobed. Leaves floating, much divided 2. BLADDERWORT.

I. BUTTERWORT. PINGUICULA.

Plants growing in bogs or on wet rocks, with radical, entire leaves, and yellow or purple flowers, on leafless radical peduncles. Calyx with 4 or 5 teeth or lobes, arranged in two lips. Corolla spurred, with a broad, open mouth; the upper lip short, broad, and 2-lobed; the lower one usually longer, broadly 3-lobed. Capsule opening in 2 or 4 valves.

The genus is limited to the northern hemisphere.

Flowers violet-purple, often large. Spur long, slender, and nearly straight 1. *Common B.*

Flowers yellow or pale-coloured. Spur small, conical or curved.

Spur very short, nearly straight. Middle lobe of the lower lip of the corolla much longer than the others. Upper lip short 2. *Alpine B.*

Spur curved. Lobes of the lower lip of the corolla nearly equal, and scarcely longer than the upper lip 3. *Pale B.*

1. Common Butterwort. *Pinguicula vulgaris*, Linn.

(Fig. 656.)

(Eng. Bot. t. 70.)

Leaves spreading, ovate or broadly oblong, of a light green, somewhat succulent, and covered with little crystalline points, which give them a wet, clammy appearance. Flower-stalks 3 to 5 inches high, with a single handsome, bluish-purple flower; the broad, campanulate

throat of the corolla attached laterally to the receptacle, and projected below into a slender spur about its own length; the lobes broad, the 2 upper ones (next the calyx) considerably shorter than the 3 lower ones. Capsule ovate, longer than the calyx.

Along mountain rills and on wet rocks, in northern Europe, all round the Arctic Circle, and along the mountain-ranges of central and southern Europe and Russian Asia. In Britain, chiefly in the western hilly districts of England and Scotland, and in Ireland. *Fl. summer, commencing very early.* A large-flowered and very handsome variety, with broader lobes and a long spur to the corolla, and a more obtuse capsule, (*P. grandiflora*, Eng. Bot. t. 2184) occurs in the bogs of south-western Ireland, and here and there in the western parts of the continent of Europe, where however it passes gradually into the commoner form.



Fig. 656.

2. Alpine Butterwort. *Pinguicula alpina*, Linn. (Fig. 657.)
(Eng. Bot. Suppl. t. 2747.)

Generally a smaller plant than the common *B.*, with much smaller flowers, of a pale-yellow or slightly purplish colour. The spur is short and obtuse, the lobes of the corolla unequal and broad, the middle one of the lower lip much longer and broader than the two lateral ones.

A very northern or high alpine plant, common in the Arctic regions of Europe and Asia, and along the higher ranges of central Europe and Russian Asia. In Britain it has only been found in the extreme north of Scotland. *Fl. early summer.*

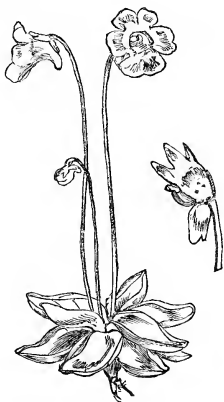


Fig. 657.

3. Pale Butterwort. *Pinguicula lusitanica*, Linn. (Fig. 658.)
(Eng. Bot. t. 145.)

Leaves of the common *B.*, but usually smaller. Peduncles very



Fig. 658.

slender, with a pale-yellow flower, tinged with lilac, still smaller than in the *alpine B.*; the spur always much curved, rather larger in proportion than in the *alpine B.*, but much shorter than in the *common B.*; the lips of the corolla nearly equal in length, and the lobes of the lower one almost equal in breadth. Capsule globular.

A west European plant, common in the bogs of Portugal and western Spain, and France, and extending to Ireland, the south and south-west of England, and west of Scotland. *Fl. all summer.*

II. BLADDERWORT. UTRICULARIA.

Some exotic species are marsh plants, either leafless or with entire radical leaves and 1-flowered peduncles; the European ones are all floating plants, without real roots at the time of flowering, but with long, root-like, capillary branches or rootstocks, all submerged; their leaves divided into short capillary segments, interspersed with little bladders or vesicles, full of air. Flowers in a terminal raceme, on a leafless flower-stem arising out of the water from a tuft of the floating branches. Calyx deeply 2-lobed. Corolla spurred as in *Butterwort*, but the mouth is closed or nearly so by the convex palate, the lobes of the lips being turned back. Capsule globular, opening in 2 valves.

A considerable genus, dispersed over nearly the whole world.

Bladders interspersed with the leaves.

Flowers of a rich yellow, about 6 to 8 lines long. Spur conical 1. *Common B.*

Flowers of a pale yellow, not 4 lines long. Spur very short 2. *Lesser B.*

Bladders on separate branches from the leaves 3. *Intermediate B.*

1. Common Bladderwort. *Utricularia vulgaris*, Linn.

(Fig. 659.)

(Eng. Bot. t. 253.)

The root-like floating branches often extend to a length of from 6 inches to a foot or more, bearing numerous capillary, much divided

leaves, from $\frac{1}{2}$ to 1 inch long, and more or less interspersed with little green vesicles. Flower-stems 6 to 8 inches high, bearing a few rather large, yellow flowers. Bracts at the base of the pedicels, and lobes of the calyx, broad and thin. Corolla with a short, conical, more or less curved spur, and a broad, convex palate; the upper lip very short, scarcely projecting beyond the palate; the lower lip much longer, thrown back from the palate; the lateral lobes turned downwards.

In deep pools, and water-channels, in Europe, Asia, and America, from the Arctic Circle to the tropics. Widely distributed over Britain, although not a common plant. *Fl. summer.*

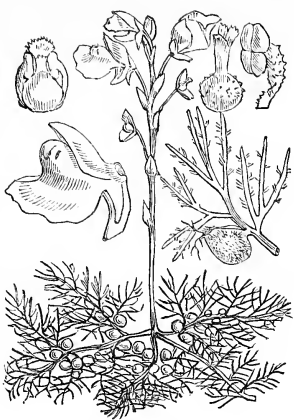


Fig. 659.

2. Lesser Bladderwort. *Utricularia minor*, Linn.

(Fig. 660.)

(Eng. Bot. t. 254.)

Differs chiefly from the *common B.* in the small size of all its parts. The floating branches are very slender, those of the flowering plant usually 2 or 3 inches long, but when barren often longer, and intricately branched; the leaves small, very fine, with few forked lobes, and seldom more than 1 or 2 bladders to each, or often without any. Flowers scarcely more than half the size of those of the *common B.*, of a pale yellow, with the lower lip much flatter; the spur usually reduced to a short, broad protuberance.

Appears to be as widely spread over northern and central Europe, Russian Asia, and northern America as the *common B.*, but not extending so far to the southward. Rather common in Ireland and Scotland, less so in England. *Fl. summer.*

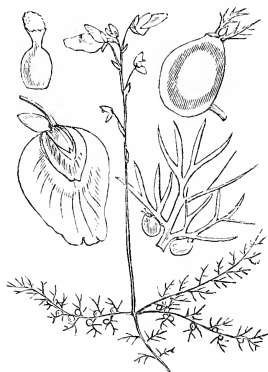


Fig. 660.

3. Intermediate Bladderwort. *Utricularia intermedia*, Hayne. (Fig. 661.)

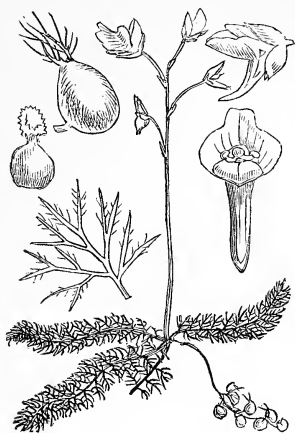


Fig. 661.

Intermediate in size between the *common B.* and the *lesser B.*, and distinguished from both by the leaves crowded in tufts at the ends of branches without bladders, the bladders being few and placed at the ends of leafless branches. Flowers of a pale yellow, larger than in the *lesser B.*, with a much more prominent spur.

In central and western Europe, much more rare than the preceding species. In Britain indicated in Dorsetshire, in Forfarshire, and in western Ireland. *Fl. summer.* I have not seen it growing, and from dried specimens I had thought that the British plant so called, usually barren, was a variety of the *lesser B.*, some of the bladder-bearing branches showing a few leaves. Mr. J.

Carroll, of Cork, informs me however that it flowers abundantly between Galway and Clifden, and cannot be confounded with the *lesser B.*, by any one who has seen the plants growing.

XLV. THE HOLLY FAMILY. AQUIFOLIACEÆ.

A small Order, widely spread over the globe, limited in Britain to a single genus, from which the few exotic ones differ slightly in the number of parts of the flower and fruit. They all nearly approach the *Celastrus* family, but have the petals usually united into a monopetalous corolla, and the stamens inserted on its base, without any fleshy disk round the ovary.

I. HOLLY. ILEX.

Shrubs or trees, with alternate leaves, and small flowers in axillary clusters. Calyx of 4 or rarely 5 small teeth. Corolla regular, deeply divided into as many segments or petals. Stamens as many, inserted

on the corolla, and alternating with its segments. Ovary sessile, 4-celled, with one pendulous ovule in each cell, and crowned by 4 minute sessile stigmas. Fruit a berry, or rather a small drupe, including 4 stones or nuts, each containing a single seed.

The species are numerous in the warmer parts of the northern hemisphere, as well as in the tropics, but reduced to very few in the more temperate regions.

1. **Common Holly.** *Ilex Aquifolium*, Linn. (Fig. 662.)

(Eng. Bot. t. 496.)

An erect, much branched evergreen shrub or bushy tree; the leaves shortly stalked, ovate, thick and shining, some quite entire, others much waved, and bordered with strong, very prickly, coarse teeth. Flowers white, in dense clusters in the axils of the leaves. Berries bright red or yellow.

Common in hedges and woods in western and southern Europe, and in central Asia, from the Caucasus to the Himalaya, but will not bear the winters of north-eastern Europe or northern Asia. Extends all over Britain, except the north-east of Scotland. *Fl. summer*.

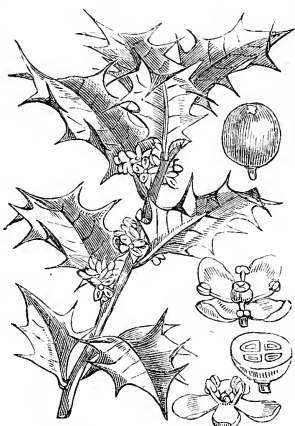


Fig. 662.

The *Snowdrop-tree* (*Halesia*) from North America, and the *Styrax* from south-eastern Europe and Western Asia, both occasionally to be met with in our shrubberies and plantations, belong to the small *Styrax* family, which is entirely exotic. It consists of trees and shrubs, with the calyx often partially adherent to the ovary, the corolla monopetalous, and stamens, although inserted on the corolla, usually more or less united together.

XLVI. JESSAMINE FAMILY. JASMINACEÆ.

Trees, shrubs, or tall climbers, with opposite (or in a very few exotic species alternate) leaves, entire or pinnate, and flowers

usually in terminal panicles or clusters. Calyx and corolla regular, each of 4 or 5 divisions, or in a few species entirely deficient. Stamens 2. Ovary and fruit 2-celled, each cell containing 1 or 2 seeds.

An Order widely spread over nearly the whole of the globe, readily known by the two stamens inserted at the base of the corolla, without reference to the number of its divisions. It is commonly divided into two:--the *Olive tribe*, with the divisions of the corolla 4 or 2, and usually valvate in the bud, which comprises the two British genera, as well as the *Olive* (*Olea*) and the *Lilac* (*Syringa*), *Filarea* (*Phillyrea*), *Chionanthus*, and *Forsythia* of our shrubberies; and the true *Jessamine tribe*, consisting of *Jessamine* and some other small exotic genera, which have 5 or more divisions to the corolla, overlapping each other and obliquely twisted in the bud. The seeds also have usually a considerable albumen in the one tribe and little or none in the other, but this difference is not constant.

Trees, with pinnate leaves, and a dry, oblong, linear fruit 1. ASH.

Shrubs, with simple leaves, and a berry 2. PRIVET.

I. ASH. FRAXINUS.

Trees, with pinnate leaves, and a dry fruit produced at the top into an oblong, rather firm wing, and divided at the base into two cells, each containing a single seed. Calyx and corolla either none, or in some exotic species 4-lobed.

A small genus, limited to the northern hemisphere, without the tropics.

1. Common Ash. *Fraxinus excelsior*, Linn. (Fig. 663.)

(Eng. Bot. t. 1692.)

A tall, handsome tree, with opposite, deciduous, pinnate leaves, consisting of from 7 to 11 ovate-lanceolate, toothed segments. The flowers open before the leaves, and appear at first sight like clusters of stamens issuing from opposite buds along the last year's shoots, each cluster surrounded by a few small, woolly scales. On examination it will be found to consist of a number of pedicels, arranged in a short raceme, each pedicel bearing a pair of sessile anthers, with an ovary in the middle, ending in a straight style with a thickened stigma. The capsules, commonly called keys, are, including the wing, about an inch and a half long.

In woods, throughout temperate Europe and western Asia, extending northwards into Scandinavia, but generally replaced in southern Europe by a closely allied but perhaps distinct species.

Common in Britain, and truly wild excepting in the northern parts of Scotland, where, however, it bears the climate in plantations. *Fl. summer*. A garden variety has been described as a distinct British species, under the name of *F. heterophylla* (Eng. Bot. t. 2476), and several American species are occasionally to be met with in our plantations.



Fig. 663.

II. PRIVET. LIGUSTRUM.

Shrubs, with opposite, simple leaves, and small white flowers. Calyx slightly 4-toothed. Corolla 4-lobed, with a short tube. Stamens short. Fruit a berry, with 2 cells and 1 or 2 seeds in each.

Besides our own, the genus contains but a small number of species, chiefly from eastern Asia, some of which are in cultivation in our gardens.

1. Common Privet. *Ligustrum vulgare*, Linn. (Fig. 664.)

(Eng. Bot. t. 764.)

A shrub, attaining 6 to 8 feet in height, with long, slender branches. Leaves nearly evergreen, lanceolate or oblong, quite entire, and shortly stalked. Flowers in short, compact panicles at the ends of the branches. Berries black, globular or somewhat ovoid.

In hedges and thickets, over the greater part of Europe and western Asia, penetrating far into Scandinavia, but so much planted in hedges



Fig. 664.

and ornamental shrubberies that its natural limits cannot well be traced. In Britain, common in southern England, and has been considered as truly wild as far north as Durham and Yorkshire. In Ireland it is only found where planted. *Fl. summer.*

XLVII. PERIWINKLE FAMILY. APOCYNACEÆ.

A large tropical Order, distinguished from the *Gentian* family chiefly by the ovary completely divided into 2 cells, or more frequently into 2 distinct carpels, whilst the style, or at least the stigma, is entire.

It is limited in Britain to the single genus *Periwinkle*, but is represented in our planthouses by the *Oleander* (*Nerium*) from southern Europe, the *Allamandas*, *Dipladenias*, etc., from South America, *Mandevilla*, and others, from tropical Asia. The closely allied *Asclepias* family, which is entirely exotic, but includes the *Periploca*, *Stapelias*, *Hoyas*, *Stephanotus*, etc., of our gardens and planthouses, differs chiefly in the curious manner in which the anthers are connected with the stigma.

I. PERIWINKLE. VINCA.

Herbs, with opposite, entire leaves, and blue, pink, or white flowers, growing singly on axillary peduncles. Calyx free, deeply divided into 5 narrow divisions. Corolla with a cylindrical or almost campanulate tube, and a flat, spreading limb, with 5 broad, oblique segments, twisted in the bud. Stamens 5, enclosed in the tube. Ovaries 2.

distinct at the base but connected at the top by a single style, terminating in an oblong stigma, contracted in the middle. Fruit consisting of 2 oblong or elongated capsules or *follicles*, each of a single cell, of a greenish colour, diverging as they ripen, and opening by a longitudinal slit on the inner side. Seeds several, without the seed-down of many exotic genera of the Order.

Leaves broadly ovate, and segments of the calyx ciliate on their

margins. Flowers large 1. *Larger P.*

Leaves narrow-ovate, and calyxes quite glabrous. Flowers small 2. *Lesser P.*

The *V. rosea*, a tropical species with erect stems, is often cultivated in our hothouses.

1. Larger Periwinkle. *Vinca major*, Linn. (Fig. 665.)

(Eng. Bot. t. 514.)

A perennial, with a creeping rootstock, long, trailing barren shoots, and nearly erect, simple flowering-stems, about a foot high. Leaves broadly ovate, evergreen, and shining, but bordered by minute hairs. Pedicels shorter than the leaves. Calyx-segments narrow, ciliate on the edges. Corolla large, blue; the tube broad, almost bell-shaped, though slightly contracted at the mouth; the lobes broad, almost angular.

In woods and shady banks, in south-central and southern Europe to the Caucasus, but, having been long cultivated for ornament, and spreading with great rapidity by its rooting stems, it has established itself much further north, and is found apparently wild in many parts of England, where, however, it seldom, if ever, ripens its seed. *Fl. spring.*



Fig. 665.

2. Lesser Periwinkle. *Vinca minor*, Linn. (Fig. 666.)

(Eng. Bot. t. 917.)

Differs from the last in its smaller size, more trailing habit, with short, erect flowering-stems; in its narrower, ovate or oblong leaves, which are perfectly glabrous; in its smaller flower, with a more open tube to the corolla, and shorter and broader segments to the calyx, without any hairs.



Fig. 666.

Its geographical range is more extended than that of the *greater P.*, being undoubtedly wild much further northwards, and more abundant in England, but yet, like that species, it is probably with us an introduced, not a truly indigenous plant. *Fl. spring and summer.*

XLVIII. GENTIAN FAMILY. GENTIANACEÆ.

Herbs more or less bitter, usually glabrous, with the exception of a few exotic species; the leaves opposite and entire, without stipules; the flowers in terminal, dichotomous cymes or panicles, with a single flower in each fork. Calyx of 4, 5, or rarely 6 to 8 divisions. Corolla regular, with a straight or open tube, sometimes very short, and a spreading limb of as many divisions as the calyx, usually twisted in the bud. Stamens as many as the divisions of the corolla, and alternating with them. Ovary of a single cell, or partially divided into 2. Capsule opening in 2 valves, with many seeds.

A rather large and very natural Order, extending nearly all over the world, but chiefly in temperate or mountain regions, some species ascending to the utmost limits of vegetation.

Leaves opposite. Terrestrial plants.

Stamens and divisions of the corolla 4.

Flowers very small, yellow 1. *CICENDIA*.

Flowers rather large, blue *Field Gentian*.

Stamens and divisions of the corolla 5 (sometimes with 5 additional smaller lobes).

Flowers pink or red. Calyx divided to the base. Style deciduous 2. *ERYTHRÆA*.

Flowers blue. Calyx not divided below the middle. Style remaining long after the flowering is over 3. *GENTIAN*.

- Stamens and divisions of the corolla usually 8. Corolla
 yellow, rotate 4. *CHLORA*.
 Leaves alternate. Water plants.
 Leaves entire, orbicular. Flowers yellow 6. *LIMNANTH*.
 Leaves with 3 leaflets. Flowers white, fringed within . . . 5. *BUCKBEAN*.

I. **CICENDIA.** *CICENDIA*.

Very small annuals, differing from *Gentian* in their deciduous style, and from *Erythræa* in the short, broad tube of the corolla, with the parts of the flowers in fours instead of fives. The few species are all European.

- Stems simple or with few erect branches. Calyx-teeth broad
 and short 1. *Slender C.*
 Stems much branched. Calyx-segments linear 2. *Dwarf C.*

1. **Slender Cicendia.** *Cicendia filiformis*, Reichb.

(Fig. 667.)

(*Exacum filiforme*, Eng. Bot. t. 235.)

A slender annual, about 2 inches high, with a few pairs of small, narrow leaves, chiefly near the base of the stem, and either simple and 1-flowered or divided into 2 or 3 branches, each with a single small yellow flower. Calyx campanulate, with 4 broad, short lobes; limb of the corolla also 4-cleft. Capsule globose, 1-celled.

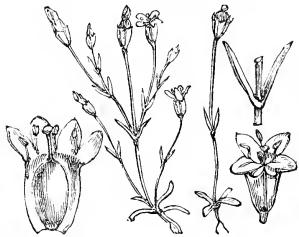


Fig. 667.

In moist, sandy situations, common in western France and Spain, extending northward to Denmark, and eastward in southern Europe to Sicily and some other parts of the Mediterranean. In Britain, only in the south-western counties of England, and in the extreme south-west of Ireland. *Fl. summer*.

2. **Dwarf Cicendia.** *Cicendia pusilla*, Griseb. (Fig. 668.)

(*C. Candollii*, Bab. Man.)

Usually a still smaller plant than the *slender C.*, and much more branched, but chiefly distinguished by its pink, white, or pale-yellow flowers, with the calyx divided to the base into narrow segments, instead of the short, broad teeth of the *slender C.*

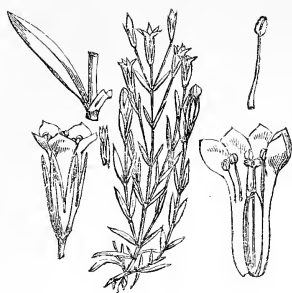


Fig. 668.

In moist, sandy situations, in France, Spain, and here and there in the west Mediterranean region, and has been found in Guernsey by Captain Gosselin. (Bab. Man.) *Fl. summer.*

II. **ERYTHRÆA.** ERYTHRÆA.

Annuals, with pink, or, in some exotic species, pale-yellow flowers, differing from *Gentian* by their more deeply divided calyx, their deciduous style, their anthers, which become more or less spirally twisted after shedding their pollen, and by the capsule in which the seed-bearing edges of the valves meet in the centre, so as to divide it more completely into 2 cells than in most others of the family.

1. Common Erythræa. *Erythræa Centaurium*, Pers. (Fig. 669.)

(*Chironia*, Eng. Bot. t. 417. *Centaury*.)



Fig. 669.

An erect annual, from an inch or two to a foot high, usually much branched in the upper part. Lower leaves usually broadly ovate, forming a spreading radical tuft; the upper ones in distant pairs, varying from ovate or oblong to narrow-linear. Flowers pink or red, usually numerous, in a terminal, repeatedly-forked cyme or panicle. Calyx-segments 5, narrow-linear. Corolla with a slender tube, and a spreading, 5-cleft limb.

In dry pastures, and sandy places, on banks, roadsides, etc.; widely spread over Europe and central Asia, extending northward to south Sweden. Common in Britain, excepting in the north of Scotland, where it is almost confined to

the coast. *Fl. all summer.* It varies much in the size and breadth of the foliage and flowers, and has been subdivided into 2, 3, or even 6 or 7 supposed species, which however run into one another so much that no precise limits can be assigned them. The most prominent forms or varieties in Britain are:

a. *Large-flowered E.* Tall, not much branched, with a compact cyme and large flowers; the tube of the corolla long and the lobes ovate.

b. *Common E. (E. pulchella, Brit. Fl.)* More branched, with numerous flowers; the tube of the corolla not much longer than the calyx, and the lobes of the limb narrow.

c. *Broad-leaved E. (Chironia pulchella, Eng. Bot. t. 458, and E. latifolia, Eng. Bot. Suppl. t. 2719.)* Including all the dwarf forms with rather large flowers and broad leaves.

d. *Linear E. (Chironia littoralis, Eng. Bot. t. 2305. E. linariifolia, Brit. Fl.)*

Much branched, usually small, with very narrow leaves and rather large flowers. The last two varieties are most frequent near the sea, where they both, as well as the small-flowered varieties, will often dwindle down to a simple stem half an inch high, with a single flower.

III. GENTIAN. GENTIANA.

Herbs, with opposite, entire leaves, and (in the British species) blue flowers, either solitary and terminal or in pyramidal or oblong panicles, the lower ones often axillary. Calyx tubular, often strongly angled, with 5, rarely 4 lobes, seldom reaching below the middle. Corolla with a cylindrical or narrow-campanulate tube, and spreading limb, divided into 5 or rarely 4 lobes, and occasionally 5 additional ones in the angles. Style remaining attached to the capsule after the flower fades. Capsule 1-celled, the placentas not meeting in the centre.

A numerous genus, spread over the northern hemisphere, especially in mountainous districts, and in the higher ranges of both the new and old world, penetrating into the tropics. One very common Swiss species, as well as several other exotic ones, have yellow flowers, but blue is the prevailing colour in the genus.

Corolla fringed at the throat with long hairs.

Calyx-lobes 4, two of them broadly ovate 5. *Field G.*

Calyx-lobes 5, all narrow-lanceolate or linear 4. *Autumn G.*

Corolla not fringed at the throat.

Stem 6 inches to a foot high. Corolla-tube above an inch

long 1. *Marsh G.*

Stem dwarf, seldom above 3 or 4 inches. Corolla an inch

long or less, with small lobes between the larger ones.

- Tufted perennial, with 1-flowered stems and a broad limb
to the corolla 2. *Spring G.*
Branched annual, with several flowers and a small limb to
the corolla 3. *Small G.*

The *Gentianella* of our gardens is the *Gentiana acaulis*, a mountain species, very common in central Europe, but not a native of Britain.

1. Marsh Gentian. *Gentiana Pneumonanthe*, Linn.

(Fig. 670.)

(Eng. Bot. t. 20.)



Fig. 670.

Rootstock perennial. Stems simple, erect, 6 inches to a foot or more high. Lower leaves oblong-lanceolate, the upper ones nearly linear, all obtuse and rather thick. Flowers nearly sessile, in opposite pairs in the axils of the upper leaves, with a terminal one close between the last pair. Lobes of the calyx narrow. Corolla an inch and a half or more long, of a deep blue within, with 5 greenish, broad lines outside; the tube without hairs at the throat; the lobes rather short, broad and spreading.

In moist heaths and pastures, chiefly in hilly districts, throughout Europe and Russian Asia, except the extreme north. In Britain, more frequent in northern than in central or southern England, but not a native of Scotland

nor recorded from Ireland. *Fl. autumn.*

2. Spring Gentian. *Gentiana verna*, Linn. (Fig. 671.)

(Eng. Bot. t. 493.)

Stock perennial and leafy, densely tufted, often spreading to 4 or 5 inches in diameter, with ovate or oblong leaves. Flower-stems simple and numerous, sometimes so short that the flowers appear sessile on the tufts of leaves, sometimes 1 or 2 inches long, bearing 1 or 2 pairs of small leaves, and a beautiful bright-blue terminal flower. Calyx very angular, with lanceolate teeth or lobes. Corolla-tube cylindrical, nearly an inch long; the limb broad and spreading, with 5 ovate lobes, and smaller 2-cleft ones between them.

One of the most common species, in mountain pastures, in central and southern Europe to the Caucasus and the Altai, but scarcely extending into northern Germany. Rare in Britain, apparently confined to a few localities in northern England and western Ireland. *Fl.* spring or early summer.



Fig. 671.

3. Small Gentian. *Gentiana nivalis*, Linn. (Fig. 672.)

(Eng. Bot. t. 896.)

A slender, erect, leafy annual, sometimes single-flowered and only an inch high, but more frequently 2 to 4 inches high and more or less branched; each branch bearing a single blue flower much like that of the *spring G.*, but considerably smaller. The tube of the corolla is but little more than 6 lines long, and the lobes of the limb not 2 lines, broadly ovate and pointed, with very small 2-cleft ones between them.

A high alpine plant, not uncommon in the higher mountain-ranges of central Europe as well as in the extreme north, but not recorded with any certainty as extending into central Asia. Rare in Britain, and only on a few of the higher Scotch mountains. *Fl.* summer.

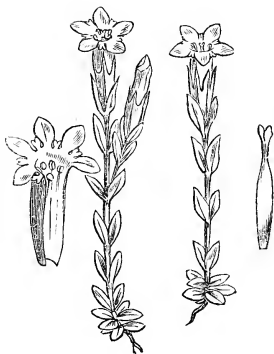


Fig. 672.

4. Autumn Gentian. *Gentiana Amarella*, Linn. (Fig. 673.)

(Eng. Bot. t. 236.)

An erect, much-branched annual, 3 or 4 inches to near a foot high, often assuming a livid-green or purplish tinge. Leaves ovate or lanceolate; the flowers numerous, sometimes much crowded, sometimes forming a loose, oblong, leafy panicle of a pale purplish-blue, and varying much in size. Calyx divided to the middle into 5 narrow-lanceolate, equal or slightly unequal lobes. Corolla-tube broad, the limb spread-



Fig. 673.

ing, divided into 5 ovate or oblong lobes, without any smaller ones between them, but furnished withinside, at the mouth of the tube, with a fringe of hairs half as long as the lobes.

In rather dry hilly pastures, in Europe and Russian Asia, extending to the Arctic Circle, but becoming rather a mountain plant in southern Europe. Diffused over the greater part of Britain. *Fl. end of summer and autumn.* The flowers (including the limb) vary with us from 6 to 9 lines in length, more rarely attaining an inch, whilst in some Continental specimens they are sometimes yet longer.

5. Field Gentian. *Gentiana campestris*, Linn. (Fig. 674.)

(Eng. Bot. t. 237.)



Fig. 674.

An erect annual, much resembling at first sight the *autumn G.*, but usually rather stouter, more branched, and more crowded with leaves and flowers, though seldom above 6 inches high; and it is easily known by the parts of the flower being in fours, not in fives, and by two of the lobes of the calyx being broadly ovate, overlapping the two other narrow ones. The blue fringe of the mouth of the corolla is very conspicuous.

In open pastures, and commons, chiefly in limestone districts, in central and northern Europe, but not recorded from the Caucasus or eastward of the Ural. More frequent in Britain than the last species. *Fl. autumn.*

IV. **CHLORA.** CHLORA.

Glaucous annuals, with yellow flowers. Calyx deeply divided as in *Erythræa*, but into 8 lobes. Corolla-tube very short; the limb spreading, 8-lobed. Stamens 8. Style persisting on the capsule as in *Gentian*.

Besides the British species, the genus includes one or two south European ones.

1. **Perfoliate Chlora.** *Chlora perfoliata*, Linn. (Fig. 675.)

(Eng. Bot. t. 60. *Yellowwort*.)

An erect, rather stiff annual, 2 or 3 inches to a foot high, of a pale glaucous-green. Radical leaves in a spreading tuft, those of the stem in distant pairs, broadly connected together at the base, so that the stem appears to pass through them, whence the specific name. Flowers of a bright yellow, in rather loose terminal cymes; the corolla nearly rotate.

In dry pastures, and waste places, generally confined to limestone districts, in western, central, and southern Europe to the Caucasus. In Britain, limited to the southern and central counties of England and Ireland. *Fl. summer*.

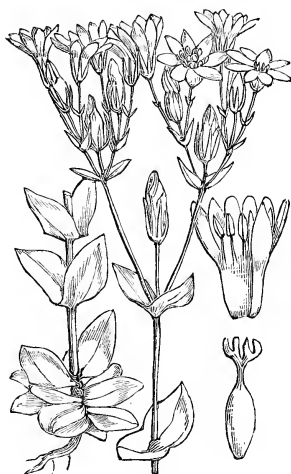


Fig. 675.

V. **BUCKBEAN.** MENYANTHES.

A single species, distinguished as a genus from *Limnanth* by its compound leaves and the capsule opening in 2 valves.

1. **Common Buckbean.** *Menyanthes trifoliata*, Linn.
(Fig. 676.)

(Eng. Bot. t. 495. *Buckbean* or *Marsh Trefoil*.)

An aquatic herb, with a creeping rootstock and densely matted roots.



Fig. 676.

Stem short, creeping or floating, with a dense tuft of leaves, consisting each of a long stalk, sheathing at the base, and 3 obovate or oblong leaflets, 1 to $1\frac{1}{2}$ inches long. Flowers white, tinged externally with red, in an oblong raceme, on a peduncle of 6 inches to a foot, proceeding from the base of the tuft of leaves. Calyx short, with rather broad green lobes. Corolla campanulate, deeply 5-lobed, and elegantly fringed on the inside with white filaments.

In wet bogs, and shallow ponds, in Europe, Russian Asia, and North America, extending into the Arctic regions. Diffused all over Britain. *Fl. summer, rather early.*

VI. LIMNANTH. LIMNANTHEMUM.

Aquatic plants, with simple, broad, floating leaves and yellow flowers. Calyx 5-cleft. Corolla nearly rotate, 5-cleft, slightly fringed within-side at the base. Capsule bursting irregularly when ripe.

A small genus, represented by some species or variety in the fresh waters of most of the temperate or tropical parts of the world.

1. Common Limnanth. *Limnanthemum nymphæoides*, Link. (Fig. 677.)

(*Menyanthes*, Eng. Bot. t. 217. *Villarsia*, Brit. Fl.)

The long stems creep and root at the base, branching and ascending to the surface of the water, bearing a single leaf at each upper branch, and a terminal floating tuft of leaves and peduncles. Leaves on long stalks, and deeply cordate, like those of a *Waterlily* on a small scale. Peduncles as long as the leafstalks, each with a single, rather large, yellow flower.

In ponds and still waters, throughout Europe and central and

Russian Asia, except the extreme north ; extending eastward to China. Found in many English counties ; but in most instances introduced as an ornamental plant, and scarcely ever naturalized in Ireland. *Fl. summer.*



Fig. 677.

XLIX. POLEMONIUM FAMILY. POLEMONIACEÆ.

Herbs or rarely shrubs, the flowers usually in terminal cymes or panicles. Calyx 5-cleft or 5-toothed. Corolla regular, 5-lobed, the lobes twisted in the bud. Stamens 5, inserted in the tube, and alternating with the lobes. Ovary single, 3-celled, with several or rarely a single seed in each cell, inserted in the inner angle. Style simple, with 3 stigmatic lobes. Capsule 3-celled, opening in 3 valves by slits opposite the middle of the cells.

A small family, spread over northern Asia and America, and western South America. Besides the European genus, it includes the *Phloxes*, *Gilias*, and *Collomias* of our flower-gardens, as well as the shrubby *Cantuas* and climbing *Cobæas* of our planthouses.

I. POLEMONIUM. POLEMONIUM.

Herbs, with pinnate leaves, and blue or white flowers in terminal corymbs. Calyx 5-lobed. Corolla with a very short tube, and a broad, open, 5-cleft limb. Stamens oblique, their filaments dilated into hairy scales. Capsule with several seeds.

A small genus, extending all round the northern hemisphere, chiefly at high latitudes.

1. Blue Polemonium. *Polemonium cæruleum*, Linn.
(Fig. 678.)

(Eng. Bot. t. 14. *Greek Valerian* or *Jacob's Ladder*.)



Fig. 678.

Stock perennial, the radical leaves forming dense tufts, their common stalk 6 inches long or more, bearing from 11 to 21 lanceolate, entire segments or leaflets of a tender green. Stems erect, $1\frac{1}{2}$ to 2 feet high, bearing a few smaller pinnate leaves, and a rather showy terminal corymb or panicle of flowers.

Widely diffused over the higher northern latitudes of Europe, Asia, and America, extending also into the mountain-regions of central Europe and Asia. In Britain it is found in several parts of the north of England, but has been so long cultivated in cottage-gardens, and seeds so readily, that it cannot be pronounced with any certainty to be truly indigenous. *Fl. summer*.

L. CONVULVULUS FAMILY. CONVULVULACEÆ.

Herbs, usually twining or prostrate (rarely, in some exotic species, erect or shrubby), with alternate leaves, or leafless and parasitical; the flowers, often very showy, growing singly or several together on axillary peduncles. Calyx of 4 or 5 distinct sepals, often very unequal. Corolla usually campanulate (but varying in form in exotic species), plaited in the bud, with 4 or 5 lobes, or nearly entire. Stamens 4 or 5, attached near the base of the corolla. Ovary and capsule containing 2, 4, or 6 seeds, and often divided into 2, 3, or 4 cells, the partitions very thin, and remaining attached to the central column, and not to the valves, when the capsule bursts. Styles simple, with 2 or rarely 3 stigmatic lobes, or 2 distinct styles.

An Order rather numerous in species, and widely spread over the warmer and temperate parts of the globe. The exotic genera, *Ipomœa*,

Pharbitis, and *Quamoclit*, recently separated from it, supply some of our most beautiful greenhouse and hothouse climbers.

- Stem leafy. Corolla campanulate 1. CONVULVULUS.
 Stem thread-like, without leaves, parasitical on other
 plants. Corolla nearly globular 2. DODDER.

I. CONVULVULUS. CONVULVULUS.

Twining or prostrate herbs (or in some exotic species erect), with alternate leaves. Sepals 5. Corolla campanulate. Style single, with 2 oblong or linear stigmatic lobes. Capsule with 4 seeds in 1 or 2 cells.

A large genus, having the geographical range of the family, but more especially abounding in the Mediterranean region.

- Bracts small, and placed on the peduncle at some distance from
 the flower. Stigma narrow-linear 1. *Lesser C.*
 Bracts large, close under the calyx. Stigma ovate or oblong.
 Stem climbing. Leaves angular at the base 2. *Larger C.*
 Stem prostrate. Leaves thick, rounded 3. *Sea C.*

The common blue *Convolvulus minor* of our gardens (*C. tricolor* of botanists) is a south European species; the so-called *Convolvulus major* is the *Ipomœa* or *Pharbitis purpurea*, a widely-spread species over the hotter parts of the world, probably of American origin.

1. Lesser Convolvulus. *Convolvulus arvensis*, Linn.

(Fig. 679.)

(Eng. Bot. t. 312. *Bindweed*.)

Rootstock slender, creeping underground to a great extent. Stems twining, but prostrate or scarcely climbing, seldom attaining above 2 feet in length. Leaves stalked, ovate-sagittate, $1\frac{1}{2}$ inches long; the lobes of the base spreading and pointed, or angular. Peduncles axillary, usually 2-flowered, with 2 small bracts at their fork, and a third on one of the pedicels, at some distance from the flower. Sepals small and broad. Corolla of a delicate pink, or nearly white, an inch or rather more in diameter. Lobes of the style narrow-linear. Capsule divided into 2 cells by a thin partition.

In fields and pastures, throughout Europe and central and Russian Asia,



Fig. 679.

except the extreme north. Common, and often a troublesome weed in England and Ireland, but apparently local in Scotland. *Fl. all summer.*

2. Larger Convolvulus. *Convolvulus sepium*, Linn.

(Fig. 680.)

(Eng. Bot. t. 313. *Bindweed.*)



Fig. 680.

Rootstock creeping as in the *lesser C.*; the twining stems climb to the length of many feet over hedges and bushes. Leaves broadly ovate or triangular, pointed, with broad, angular lobes at the base. Peduncles bearing a single large flower of a pure white, with a pair of large, leafy bracts immediately under the calyx and completely enclosing it. Stigmas obovate-oblong. Capsule without any partition between the seeds.

In hedges and bushy places, throughout Europe and Russian Asia, except the extreme north, and in North America. Abundant in England and Ireland, but local in Scotland. *Fl. summer.* This and the following species are often removed from *Convolvulus* as a distinct genus, under the name of *Calystegia*.

3. Sea Convolvulus. *Convolvulus Soldanella*, Linn.

(Fig. 681.)

(Eng. Bot. t. 314.)

Rootstock creeping. Stems short, prostrate and scarcely twining. Leaves small, thick, broadly rounded or kidney-shaped, with broad, rounded or angular lobes at the base. Peduncles 1-flowered, with the two large bracts of the *larger C.* Corolla nearly as large, of a light pink colour, the stigmas longer and more pointed than in the *larger C.*, but shorter and broader than in the *lesser C.*

In maritime sands, in the temperate regions of both the northern and southern hemispheres, scarcely penetrating into the tropics. Not uncommon on the coasts of England, Ireland, and southern Scotland. *Fl. summer.*



Fig. 681.

II. DODDER. CUSCUTA.

Annual, parasitical, leafless herbs, with twining thread-like stems, attaching themselves to the plants on which they grow by minute tubercles; the small, nearly globular flowers in lateral heads or clusters. Calyx coloured like the corolla, deeply 4- or 5-cleft. Corolla with a broad tube, and 4 or 5 usually spreading lobes, and as many small scales inside the tube. Styles 2, distinct from the base, or in some exotic species, united to near the top. Capsule globular, with 4 seeds in 2 cells.

A genus widely spread over the globe, comprising a considerable number of species, and still more numerous varieties, remarkable as showing great general similarity of aspect, but much diversity in minute characters derived chiefly from the size and form of the corolla and of the scales, the constancy of which has not yet been satisfactorily ascertained.

Corolla more than a line in diameter, with short, broad lobes, and inconspicuous, appressed scales.

Calyx shorter than the corolla-tube, which is not much swollen when first flowering 1. *Greater D.*

Calyx as long as the globular corolla-tube. Plant growing on Flax only 2. *Flax D.*

Corolla usually less than a line in diameter, with pointed, spreading lobes; the scales prominent, and nearly closing the tube 3. *Lesser D.*

1. Greater Dodder. *Cuscuta europæa*, Linn. (Fig. 682.)

(Eng. Bot. t. 378.)

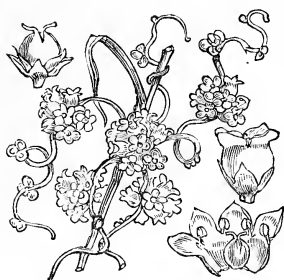


Fig. 682.

The whole plant is of a pale greenish-yellow, tending more or less to redden in many situations. Flowers in sessile, globular clusters, 4 or 5 lines in diameter; each flower a little more than 1 line in diameter, sessile or borne on an exceedingly short pedicel. Sepals broad and rounded. Tube of the corolla at first broadly cylindrical, longer than the calyx, with broad and short lobes, and very minute, scarcely perceptible scales inside. Styles and stamens usually enclosed in the tube. As the capsule enlarges, the tube of the corolla becomes nearly globular.

Parasitic on a great variety of plants, more especially on herbaceous stems, in Europe and temperate parts of Asia. Not very abundant in England, and not recorded with certainty either from Ireland or Scotland. *Fl. summer.*

2. Flax Dodder. *Cuscuta Epilinum*, Weihe. (Fig. 683.)

(Eng. Bot. Suppl. t. 2850.)



Fig. 683.

Differs slightly from the *greater D.* in its flowers rather larger and more succulent but fewer in number, the calyx rather longer, the corolla-tube globular even when young, and the lobes still shorter in proportion.

Said to grow exclusively on Flax, in Europe and Russian Asia, and introduced into Britain with the cultivation of that plant. *Fl. summer.*

3. Lesser Dodder. *Cuscuta Epithymum*, Linn. (Fig. 684.)

(*C. europæa*, Eng. Bot. t. 55. *C. Trifolii*, Bab. Man.)

The thread-like stems are much finer than in the *greater D.*; the heads of flowers small, globular, and very compact. Flowers often considerably less than a line in diameter, and very seldom attaining that size; the calyx smaller in proportion; the lobes of the corolla pointed, spreading, and about as long as the tube; the scales of the inside more prominent, almost closing the tube, and the style and stamens usually slightly protruding, though shorter than the lobes.



Fig. 684.

In open, sunny situations, chiefly on *Thyme*, *Heath*, and other small shrubby plants, in Europe and temperate Asia. More frequent in England than the *greater D.*, and extending into southern Scotland, but unknown in Ireland. *Fl. summer.*

LI. THE BORAGE FAMILY. BORAGINEÆ.

Herbs, usually rough with coarse hairs (rarely shrubs or even trees, in some exotic genera), with alternate, simple, usually entire leaves; the flowers in one-sided spikes or racemes, rolled back when young, and usually forked or dichotomous. Calyx of 5 divisions or teeth. Corolla regular or slightly irregular, monopetalous, with a 5-cleft limb. Stamens 5, inserted in the tube of the corolla, and alternating with its divisions. Ovary deeply 4-lobed (or, in some exotic genera, 2-lobed), with a simple style inserted between the lobes. Fruit consisting of as many small, 1-seeded nuts, having the appearance of seeds, and enclosed within or surrounded by the calyx.

A numerous family in the northern hemisphere, with a few representatives in the tropics or in the southern hemisphere; easily distinguished by the 4 seed-like nuts from all but *Labiates*, and from these by their alternate leaves and more regular flowers.

Tube of the corolla open, without any scales or valves at its orifice.

Stamens protruding beyond the corolla.

Corolla oblique, and more or less irregular, with erect or scarcely spreading lobes 1. *ECHIAM*.

Corolla regular, with a straight tube and spreading limb 3. *MERTENSIA*.

Stamens included in the tube of the corolla.

Calyx tubular, the lobes not reaching to the middle 2. *LUNGWORT*.

Calyx divided to the base. Nuts very hard 4. *LITHOSPERM*.

Tube or centre of the corolla more or less closed at its orifice by scales or valves, or stamens.

Corolla tubular, with 5 small teeth 8. *COMFREY*.

Corolla rotate, the anthers erect, forming a cone in the centre 9. *BORAGE*.

Corolla (small) with a slightly bent tube, and rather oblique spreading limb 7. *BUGLOSS*.

Corolla with a straight tube, and regular, spreading limb.

Calyx broad and somewhat flattened, enlarged after flowering, with 5 small teeth between the large ones 10. *ASPERUGO*.

Calyx regularly 5-cleft.

Nuts depressed, ovate or round, muricated and burr-like 11. *HOUND'S-TONGUE*.

Nuts ovoid, erect, smooth or wrinkled.

Nuts wrinkled. Spikes with a bract under each flower 6. *ALKANET*.

Nuts smooth and shining. Racemes without bracts. Flowers usually small 5. *MYOSOTE*.

Among exotic genera, *Echinospermum lappula*, a south European annual, which has all the appearance and the small flowers of a *Myosote*, but with triangular, very rough nuts, has been occasionally found in isolated localities in England, when accidentally introduced with Continental weeds. The well-known *sweet Heliotrope* of our gardens belongs to a large exotic genus, truly *Boragineous*, though somewhat anomalous in the closer union of the nuts. The *Nemophilas* and *Eutocas* of our flower-gardens belong to the small allied *Hydrophyllum* family, which has the inflorescence and flowers of the *Borage* family, but the fruit is a capsule, and the leaves often divided.

I. *ECHIAM*. *ECHIAM*.

Coarse biennials, or, in exotic species, half-shrubby perennials, with blue or purple flowers. Calyx deeply divided. Corolla with a broad,

open mouth to the tube, and an oblique limb, with 5 erect or scarcely spreading, unequal teeth or lobes. Stamens protruding from the tube, and unequal in length. Style 2-cleft. Nuts wrinkled.

A rather numerous genus in the Canary Islands and western and southern Africa, with a few European and west Asiatic species.

Stems very erect. Corolla-tube narrow to the top of the calyx.

Longest stamens longer than the corolla 1. *Common E.*

Stems ascending. Corolla-tube broadly campanulate. Longest stamens not longer than the lower lobes of the corolla 2. *Purple E.*

1. Common Echium. *Echium vulgare*, Linn. (Fig. 685.)

(Eng. Bot. t. 181. *Viper's Bugloss*.)

Stem erect, 1 to 2 feet high, covered with stiff, spreading, almost prickly hairs. Radical leaves stalked and spreading, but often withered away at the time of flowering; the stem-leaves linear-lanceolate, several inches long. Flowers showy, at first of a reddish-purple, turning afterwards bright blue, in numerous one-sided spikes, forming a long terminal panicle. Corolla about 7 lines long, the narrow part of the tube about as long as the calyx, the limb very oblique, the longest stamens longer than its lower lobes.

On roadsides and waste places, throughout Europe and western Asia, except the extreme north. Dispersed over a great part of Britain, abundant in some parts of southern England, but becomes more rare in the north. *Fl. all summer.*



Fig. 685.

2. Purple Echium. *Echium violaceum*, Linn. (Fig. 686.)

(Eng. Bot. Suppl. t. 2798.)

Radical leaves broader and more prominent than in the *common E.*; the stems branched from the base, and more spreading; the flowering spikes fewer and much longer; the flowers highly coloured, much larger, often an inch long; the narrow part of the tube very short,



Fig. 686.

spreading into a broad-campanulate throat, with a very oblique limb; the lower lobes rather longer than the longest stamens.

In waste places, chiefly near the sea, in southern Europe, and extending up the western coasts to the Channel Islands. *Fl. summer.*

II. **LUNGWORT.** PULMONARIA.

Perennial herbs, with a creeping rootstock and rather large blue or purple flowers. Calyx tubular-campanulate, 5-toothed or cleft to the middle only. Corolla with a straight tube open at the mouth, without scales, and a spreading, 5-lobed limb. Stamens included in the tube. Nuts smooth.

A European genus, limited to a very few species.

1. **Common Lungwort.** *Pulmonaria officinalis*, Linn.

(Fig. 687.)

(Eng. Bot. t. 118.)

Radical leaves in distinct tufts, ovate-oblong or nearly linear, on long footstalks, and coarsely hairy, usually much spotted. Flowering stems from 6 inches to a foot high, with shorter, alternate, mostly sessile leaves, the lowest sometimes reduced to scales. Flowers in a terminal forked cyme. Calyx very hairy, little more than 4 lines long at the opening of the flower, but twice that length when in fruit, the teeth or lobes not reaching to the middle. Limb of the corolla broadly spreading, with short lobes.

In woods, in central and southern Europe to the Caucasus, extending northwards into Scandinavia. Rare in Britain, the only really

wild stations appearing to be in Hampshire and the Isle of Wight. *Fl. spring*. The British specimens belong to a variety with narrow leaves, rarely spotted, usually distinguished as a species under the name of *P. angustifolia* (Eng. Bot. t. 1628), but in many parts of the Continent the two forms pass very gradually one into the other. The broad-leaved variety, here figured, has been long cultivated in cottage-gardens, and has strayed into adjoining woods in some parts of the country.



Fig. 687.

III. **MERTENSIA.** MERTENSIA.

Perennial herbs, nearly glabrous, differing from *Lungwort* in their short, open, deeply 5-cleft calyx, in the stamens protruding slightly from the tube of the corolla although shorter than the limb, and in their slightly fleshy nuts.

Besides the British species there are several nearly allied to it from North America and Siberia.

1. **Sea Mertensia.** *Mertensia maritima*, Don. (Fig. 688.)

(*Pulmonaria*, Eng. Bot. t. 368.)

A procumbent, leafy perennial, almost succulent, covered with a glaucous bloom. Leaves obovate, entire, rather thick, and often wavy; the lower ones stalked, the upper ones sessile. Flowers rather small, of a beautiful purple-blue, forming a loose terminal cyme; the pedicels nearly 6 lines long. Segments of the calyx ovate, very broad after flowering, but scarcely longer than the nuts.



Fig. 688.

A seacoast plant, common in northern Europe and Asia and north-west America, at high latitudes, and descending along the coasts of Scotland to north-western England, North Wales, and Ireland. *Fl. spring and early summer.*

IV. LITHOSPERM. LITHOSPERMUM.

Annuals, perennials, or, in some exotic species, undershrubs, more or less hairy; with leafy stems, and blue or whitish flowers, in leafy cymes or one-sided spikes. Calyx deeply 5-cleft. Corolla with a straight tube, not closed by scales, and a spreading, shortly 5-lobed limb. Stamens included within the tube. Nuts very hard and stony.

A considerable genus, widely spread over Europe and northern Asia, although most of the species belong to the Mediterranean region.

Flowers small, white or pale yellow. Stems erect.

Stock perennial. Nuts smooth. 2. *Common L.*

Annual. Nuts wrinkled. 1. *Corn L.*

Flowers showy, of a bright blue. Stems long and straggling. 3. *Creeping L.*

1. **Corn Lithosperm.** *Lithospermum arvense*, Linn.

(Fig. 689.)

(Eng. Bot. t. 123. *Corn Gromwell. Bastard Alkanet.*)

An erect, usually branched annual, about a foot high, and more or less hoary with appressed hairs. Leaves narrow-lanceolate or nearly linear. Flowers small and white, sessile, in leafy terminal cymes; the

segments of the calyx nearly as long as the corolla. Nuts shorter than the calyx, conical, very hard, and deeply wrinkled.

In cultivated and waste places, in Europe and western and central Asia, not extending to the Arctic regions, but carried out as a cornfield weed to various parts of the world. Rather frequent in England, Ireland, and southern Scotland, but less so in the north. *Fl. spring and summer.*



Fig. 689.

2. Common Lithosperm. *Lithospermum officinale*, Linn. (Fig. 690.)

(Eng. Bot. t. 134. *Gromwell.*)

Stock perennial, with a stouter and taller stem than that of the *corn L.*, which this species otherwise much resembles. Flowers rather smaller, of a yellowish white; the calyx shorter in proportion. Nuts hard and white, very smooth and shining, without any wrinkles unless dried before they are ripe.

In waste places, on roadsides, etc., diffused over the whole of Europe and Russian Asia, except the extreme north, and established in many parts of North America. Common in several parts of England and Ireland, but rare in Scotland. *Fl. spring and summer.*



Fig. 690.

3. Creeping Lithosperm. *Lithospermum purpureo-cæruleum*, Linn. (Fig. 691.)

(Eng. Bot. t. 117.)



Fig. 691.

Stock perennial, with procumbent, leafy stems, often 2 feet long or more, and shorter, ascending or nearly erect flowering stems, ending in a leafy forked cyme. Leaves lanceolate and hairy. Flowers nearly sessile, of a rich blue, rather large, but usually shorter than the leaves; the calyx-segments narrow. Nuts smooth and shining.

In thickets and open woods, in central and southern Europe, from the Atlantic to the Caucasus. Rare in Britain, and only in some of the southern counties of England. *Fl. summer.*

V. **MYOSOTE.** MYOSOTIS.

Annual or perennial, low or rather weak herbs, with oblong or linear stem-leaves; the radical ones broader, shorter, and stalked; the flowers small, blue or white, in one-sided racemes, either forked or simple, without bracts at the base of the pedicels. Calyx 5-toothed or 5-cleft. Corolla with a small, straight tube, half closed at its mouth by 5 short scales, and a spreading, flat or concave, 5-lobed limb. Stamens included in the tube. Nuts smooth and shining, compressed or triangular, attached by their small base.

A numerous genus in Europe and northern Asia, scarce in North America, but reappearing in Australia. Although the characters which separate it from *Alkanet* appear slight, it is very distinct in habit.

Calyx-teeth short or not divided beyond the middle. Hairs

of the calyx appressed 1. *Water M.*

Calyx deeply cleft, the hairs spreading or hooked.

Pedicels as long or longer than the calyx, 3 to 6 lines long when in fruit.

- Perennial with rather large flowers. Limb of the corolla flat 2. *Wood M.*
 Annual or biennial, with small flowers. Limb of the corolla often concave 3. *Field M.*
 Pedicels not above a line long, usually shorter than the calyx. Annuals.
 Stem ascending or branched from the base. Calyx usually open after flowering. Corolla always blue . . . 4. *Early M.*
 Stem erect, simple at the base. Calyx always closed after flowering. Corolla at first yellow, afterwards blue 5. *Changing M.*

Some exotic species are cultivated in our flower-gardens, together with varieties of the *water M.*, the *wood M.*, and the *early M.*

1. Water Myosote. *Myosotis palustris*, With. (Fig. 692.)

(Eng. Bot. t. 1973. *Forget-me-not.*)

Perennial stock usually slightly creeping; the stems weak, ascending, from 6 to 18 inches high, often nearly glabrous, but sometimes rather thickly clothed with spreading hairs. Leaves glabrous or with appressed hairs. Flowers of a bright clear blue, with a yellow eye, very variable in size, but usually rather large for the genus. Calyx never divided below the middle, whilst in all other British species it is deeply cleft.

In wet ditches, and by the sides of streams, in Europe, Russian Asia, and northern America, extending into the Arctic Circle. Abundant in Britain.

Fl. the whole summer. Modern botanists divide it into three: the true *Forget-me-not*, which is often nearly glabrous, with a broad flat corolla, and short broad teeth to the calyx; *M. repens* (Eng. Bot. Suppl. t. 2703), which is more hairy, with narrower lobes to the calyx, reaching to about the middle; and *M. caespitosa* (Eng. Bot. Suppl. t. 2661), with a smaller corolla, with the limb often slightly concave: the first is more common in the south, the last in the north, but they all three run so much one into another as not to be distinguishable with certainty even as varieties.



Fig. 692.

2. **Wood Myosote.** *Myosotis sylvatica*, Hoffm. (Fig. 693.)
(Eng. Bot. Suppl. t. 2630. *M. rupicola*, Eng. Bot. t. 2559.)



Fig. 693.

A perennial, like the *water M.* but with a more tufted stock, and rather roughly hairy. Calyx cleft nearly to the base, with narrow segments, erect when in fruit; its hairs more or less spreading, and crisped or hooked when seen through a lens. Corolla as large or even larger than in the *water M.*, with the limb spread out flat.

In mountain pastures and shady situations, common in the far north of Europe and Asia, as well as in the great central chains from the Pyrenees to the Caucasus and the Altai. Not frequent in Britain, and perhaps limited to Scotland, the north of England, and Ireland. *Fl. summer.* It varies much in size and stature; in lower shady situations, and in our gardens, the stems will attain a foot or more in length, with rather small

flowers. The alpine form, with larger flowers, is by some distinguished as a species, under the name of *M. alpestris*.

3. **Field Myosote.** *Myosotis arvensis*, Roth. (Fig. 694.)
(Eng. Bot. Suppl. t. 2629.)



Fig. 694.

An annual or sometimes biennial, with a weak stem often above a foot long. It has the hairy foliage and deeply cleft calyx of the *wood M.*, but the corolla, although variable, is much smaller, with a short, concave limb. Calyx shorter than the pedicels or scarcely so long, even when in fruit, with narrow segments, erect when in fruit.

On hedge-banks, in cultivated ground, the edges of woods, and bushy places, throughout Europe and central and northern Asia, and in North America. The most common species all over Britain. *Fl. all summer and autumn.* Some of the larger-flowered specimens are difficult to distinguish in the dried state from the smaller-flowered ones of the *wood M.*, but when fresh I have never observed any really intermediate forms.

4. **Early Myosote.** *Myosotis collina*, Hoffm. (Fig. 695.)
(*M. arvensis*, Eng. Bot. t. 2558.)

A low, much branched, hairy annual, seldom attaining 6 inches; the leaves mostly collected in radical tufts, with a few at the base of the flowering branches, which consist chiefly of the slender racemes; the pedicels seldom above a line long. Calyx, when dry, exactly like that of the *field M.*, but in the living plant its segments are spreading, not erect, after flowering. Corolla very small, of a bright blue, with a small, concave limb.

On dry, open places, in central and southern Europe, to the Caucasus and the western Himalaya. Not so frequent in Britain, but apparently more so in the south of England than further to the north, and is also found in Ireland.

Fl. early summer, and dies soon after. A white-flowered and more permanent variety is often cultivated. Occasional intermediate forms excite some doubts as to whether this be really specifically distinct from the *field M.*



Fig. 695.

5. **Changing Myosote.** *Myosotis versicolor*, Pers.
(Fig. 696.)

(*M. scorpioides*, Eng. Bot. t. 480. f. 1.)

A little hairy annual, with a more simple and erect stem than any of the foregoing, from a few inches to near a foot high, with a spreading tuft of radical leaves, and a few erect ones along the stem. Flowers small and nearly sessile; the calyx-segments quite closed over the fruit after flowering; the corolla small, at first pale-yellow, and turning blue as it fades.

On banks, in meadows and pastures, in central and southern Europe and western Asia, extending northwards into Scandinavia. Abundant in Britain. *Fl. spring.*



Fig. 696.

VI. **ALKANET.** *ANCHUSA.*

Coarse, hairy biennials or perennials, with rather large blue flowers, in one-sided spikes, with a bract under each flower. Calyx deeply 5-cleft. Corolla with a straight tube, often slightly enlarged at the top, and closed at the mouth by scales usually hairy; the limb spreading and 5-lobed. Stamens included in the tube. Nuts rather large, wrinkled, angular, attached by their broad, concave base.

The species are numerous in southern Europe and western Asia, a very few extending far to the north.

Leaves lanceolate. Flowers in terminal forked panicles . . . 1. *Common A.*
 Leaves broadly ovate. Flowers in short axillary spikes . . . 2. *Green A.*

1. **Common Alkanet.** *Anchusa officinalis*, Linn. (Fig. 697.)

(Eng. Bot. t. 662.)



Fig. 697.

A biennial, about 2 feet high, with coarse, stiff hairs; the root thick and hard. Radical leaves long and stalked; the lower stem-leaves lanceolate, broad or narrow, from 2 to 5 or 6 inches long; the upper ones gradually smaller. The one-sided forked spikes lengthen considerably as the flowering advances, and form a kind of terminal panicle. Flowers nearly sessile, with a small, leafy bract at the base of each; the calyx very stiffly hairy, with narrow divisions; the corolla of a rich blue, and rather large, but varies in size.

In waste places, on roadsides, etc., all over the continent of Europe, except the extreme north, and eastward to the Caucasus. In Britain, only in a few localities, chiefly on the east coast of England, and supposed to be an introduced plant. *Fl. summer.*

2. **Green Alkanet.** *Anchusa sempervirens*, Linn. (Fig. 698.)

(Eng. Bot. t. 45.)

Stock perennial, the stems more straggling than those of the *common A.*, but covered with the same coarse, stiff hairs. Leaves broadly ovate; the flowers in one-sided, short spikes, leafy at the base, and

placed in the axils of the stem-leaves. Corolla of a rich blue, with a shorter tube than in the *common A.* Nuts expanded at the base on the inner side into a small convex appendage.

In waste places, on roadsides, etc., in western Europe, scarcely extending eastward along the Mediterranean, and not reaching the Rhine. Scattered over several parts of Britain, but probably truly wild only in south-western England. *Fl. spring and summer.*



Fig. 698.

VII. BUGLOSS. LYCOPSIS.

A small European and north Asiatic genus, distinguished from *Alkanet* by the curved tube of the corolla. The species are all annuals, with small flowers.

1. Small Bugloss. *Lycopsis arvensis*, Linn. (Fig. 699.) (Eng. Bot. t. 938.)

A coarse, spreading annual, covered with very stiff hairs. Stems procumbent at the base, branched, 1 to 2 feet long. Leaves lanceolate or oblong-linear, waved on the edges, and often toothed; the lower ones often stalked, the upper ones sessile or stem-clasping. Flowers in simple or forked, terminal, one-sided spikes. Calyx deeply 5-cleft, and nuts wrinkled as in *Alkanet*. Corolla pale-blue, with the tube always curved in the middle.

A common European and north Asiatic weed of cultivation, carried out with European crops to North America and other parts of the world. Extends all over Britain. *Fl. summer.*



Fig. 699.

VIII. **COMFREY.** SYMPHYTUM.

Rough, hairy perennials, with yellow or purple drooping flowers, in short, terminal, forked cymes, and no bracts under the pedicels. Calyx deeply 5-cleft. Corolla tubular, but enlarged above the middle, where it is closed inside by 5 lanceolate scales, and terminating in 5 very small spreading teeth or lobes. Stamens shorter than the corolla. Nuts ovoid, smooth, attached by their base.

The genus contains but few species, nearly resembling each other, and extends over Europe and northern Asia.

Stem 2 or 3 feet high, branched, more or less winged by the

decurent base of the leaves 1. *Common C.*

Stem simple, about a foot high. Leaves stalked or scarcely

decurent 2. *Tuberous C.*

1. **Common Comfrey.** *Symphytum officinale*, Linn.

(Fig. 700.)

(Eng. Bot. t. 817.)



Fig. 700.

Rootstock thick, with stout, erect, branching, annual stems, 2 or 3 feet high. Leaves broadly lanceolate, often 8 or 9 inches long or more, tapering into a long point, and rough with short, stiff hairs; the lower ones stalked, the upper ones sessile and decurrent along the stem to the next leaf below or even lower down. Flower-cymes stalked above the last leaf, once or seldom twice forked; the branches forming short, one-sided racemes. Flowers all pedicellate, 3 lines long, either pale-yellow or dark dingy-purple.

On moist banks, the borders of meadows, etc., in Europe and western Asia, extending northward into southern Scandinavia. Frequent in England and Ireland but less so in Scotland, and not found to the north of

Aberdeen or Glasgow. *Fl. spring and summer.*

2. **Tuberous Comfrey.** *Symphytum tuberosum*, Linn.
(Fig. 701.)

(Eng. Bot. t. 1502, *a luxuriant garden specimen.*)

A much smaller plant than the common species, seldom above a foot high, and not branched. The rootstock forms a short woody tuber. Leaves mostly ovate and stalked; the upper ones nearly sessile, and very slightly decurrent. Cymes small and few-flowered, the flowers themselves about the size of the common *C.*

In woods, and on shady banks, in central and southern Europe, but scarcely extending into northern Germany. In Britain, rather more northern, being more frequent in southern Scotland than in England. Not recorded from Ireland. *Fl.* summer.



Fig. 701.

IX. **BORAGE.** BORAGO.

Rough, hairy annuals or biennials, with blue flowers in loose forked cymes. Calyx deeply 5-cleft. Corolla rotate; the tube exceedingly short; the mouth closed by short scales. Stamens 5; the filaments very short and forked; the anthers forming an erect cone in the centre of the flower. Nuts attached by their excavated base, and free from the style.

A genus of few species, chiefly from north-eastern Europe and western Asia.

1. **Common Borage.** *Borago officinalis*, Linn. (Fig. 702.)

(Eng. Bot. t. 36.)

Stem erect, with spreading branches, a foot high or rather more. Lower leaves obovate or oblong, narrowed at the base into long stalks; the upper ones more shortly stalked, and narrower. Flowers on long



Fig. 702.

pedicels, drooping, of a clear blue or sometimes white; the dark anthers very prominent in the centre.

In waste grounds, indigenous to the east Mediterranean region, but, long cultivated in European gardens, it has become naturalized in many parts of central and western Europe, and is said to be fully established in several counties of England. *Fl. all summer.*

X. **ASPERUGO.** ASPERUGO.

A single species, allied to *Alkanet*, but universally admitted as a genus on account of the peculiar calyx and habit.

1. German *Asperugo*. *Asperugo procumbens*, Linn.

(Fig. 703.)

(Eng. Bot. t. 661. *Madwort*.)

A weak procumbent annual, rough with short, stiff, almost prickly hairs, many of them curved or hooked so as to be very adhesive. Leaves oblong or lanceolate, narrowed at the base, the lower ones stalked, those under the flowers often nearly opposite. Flowers small and blue, 1 to 3 together in the axils of the upper leaves, on very short, recurved pedicels. The broadly campanulate calyx enlarges immediately after flowering, becomes much flattened, veined, and divided to the middle into 5 lanceolate lobes, with 1 or 2 small ones between each. Corolla that of a very small *Alkanet*. Nuts ovoid, with a granulated surface.

In cultivated and waste places, over nearly the whole of Europe and northern Asia short of the Arctic Circle. Occurs as a weed of cultivation in many parts of England and southern Scotland, but not recorded from Ireland. *Fl. summer.*



Fig. 703.

XI. HOUND'S-TONGUE. CYNOGLOSSUM.

Stout, erect biennials, clothed with rough hairs, which are, however, more appressed and hoary than in most *Boragineous* plants; with long, narrow leaves, and rather small, blue or purplish-red flowers, in simple or forked, one-sided racemes. Calyx deeply 5-cleft. Corolla with a short tube, closed at the mouth by prominent scales, and a spreading, 5-lobed, regular limb. Nuts rather large, depressed, attached laterally to the base of the style, and covered with short, hooked prickles, so as to make them very adhesive burs.

A European and Asiatic genus, rather numerous in species, especially if considered as including the little blue-flowered *Omphalodes* and the white-flowered *C. linifolium*. These two species, formerly frequent in our flower-gardens, are however sometimes distinguished with some others as a genus by the nuts, which instead of being muricated all over, have a raised, more or less toothed border.

Leaves hoary with rather soft appressed hairs. Flowers dull

purple-red 1. *Common H.*

Leaves green, rough with scattered hairs. Flowers bluish-

purple 2. *Green H.*

1. Common Hound's-tongue. *Cynoglossum officinale*, Linn. (Fig. 704.)

(Eng. Bot. t. 921.)

Stem stout, erect, and branched, about 2 feet high, with rough hairs.



Fig. 704.

Leaves lanceolate, or often the radical and lowest ones oblong, stalked, and sometimes near a foot long; the others gradually shorter, with shorter stalks, the uppermost sessile and clasping the stem: all of them hoary with a dense, rather soft, appressed down. Racemes numerous, mostly simple, forming a terminal leafy panicle; the pedicels short, without bracts. Calyx segments broadly lanceolate. Corolla rather small, of a dull purplish-red. Nuts flattened and bur-like, often above 3 lines diameter. The whole plant has a disagreeable smell.

On roadsides and waste places, in Europe and Russian Asia, extending far into Scandinavia. Not unfrequent in England and Ireland, but becoming rare in Scotland. *Fl. summer.*

2. Green Hound's-tongue. *Cynoglossum montanum*, Linn.

(Fig. 705.)

(*C. sylvaticum*, Eng. Bot. t. 1642.)



Fig. 705.

Much like the *common H.*, but generally not so stout, much greener; the hairs of the leaves fewer, more scattered, and stiffer; the upper leaves broader at the base, and the spikes more slender, with fewer and smaller flowers, of a dull bluish-purple tinge.

In woods and shady places, chiefly in the forests and mountain districts of the continent of Europe, extending eastward to the Caucasus. Not common in Britain, occurring in the southern and some of the central or eastern counties of England, rare in Ireland, and not known in Scotland. *Fl. summer.*

LII. THE SOLANUM FAMILY. SOLANACEÆ.

Herbs, shrubs, or soft-wooded trees, with alternate leaves without stipules, but sometimes accompanied by a smaller leaf at their base; the flowers solitary or in forked cymes, on lateral or terminal peduncles. Calyx usually with 5 teeth, lobes, or segments. Corolla monopetalous, with 5 or rarely 4 teeth or lobes, regular or nearly so, and folded in the bud. Stamens as many as the lobes of the corolla, and alternating with its divisions. Ovary 2-celled, rarely incompletely 4-celled, with several ovules in each cell. Fruit a berry or rarely a capsule, with several seeds.

A numerous family in the tropical and warmer parts of the globe, only represented in northern regions by a few stragglers from more southern latitudes. A large proportion of the species contain more or less of a narcotic, poisonous principle, although several are among the important articles of food.

Fruit a capsule.

Corolla large, with a long tube. Capsule prickly, 4-valved 1. DATURA.

Corolla obliquely campanulate, with a short tube. Capsule smooth 2. HENBANE.

Fruit a berry.

Corolla rotate. Anthers close together, in a projecting cone, opening by pores at the top 3. SOLANUM.

Corolla campanulate. Anthers distinct, opening by longitudinal slits 4. ATROPA.

Several *Solanaceæ* belonging to exotic genera are cultivated for use or ornament, among which may be mentioned the *Tobacco* (*Nicotiana*) and the closely allied ornamental genera *Petunia* and *Nierembergia*, the *Mandrake* (*Mandragora*), the *Winter-cherry* (*Physalis*), the *Cayenne Pepper* (*Capsicum*), as well as the *Cestrums* and *Fabianas* and even *Nolanas* of our gardens, which, although somewhat anomalous, are considered by most botanists as belonging to the *Solanum* family.

I. DATURA. DATURA.

Coarse annuals or soft-wooded shrubs. Corolla long, funnel-shaped, and regular. Capsule large, opening in 4 valves, and partially divided into 4 cells.

A small genus, spreading over the warmer regions of the globe. The large, shrubby *Daturas* often distinguished as *Brugmansias* on account of their smooth, not prickly capsules, are from South America.

1. Thorn-apple *Datura Stramonium*, Linn.

(Fig. 706.)

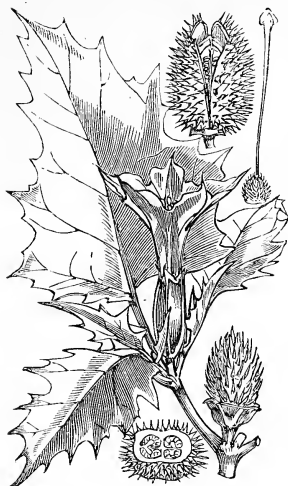
(Eng. Bot. t. 1288. *Thorn-apple*.)

Fig. 706.

Fl. summer and autumn.

A coarse, glabrous or slightly downy annual, 1 or 2 feet high, with spreading, forked branches. Leaves rather large, ovate, with irregular, angular or pointed teeth or lobes. Flowers solitary, on short peduncles, in the forks or at the ends of the branches. Calyx loosely tubular, about $1\frac{1}{2}$ inches long, and falls off after flowering, leaving a small rim under the capsule. Corolla above 3 inches long, bordered with 5 narrow, distant teeth, usually white, but occasionally (especially in hot countries) purple. Capsule nearly globular, very prickly, with numerous wrinkled seeds.

A common roadside weed, in southern Europe and all over the warmer parts of the globe, extending northward into southern Sweden. Appears not unfrequently in southern England, but can scarcely be considered as naturalized.

II. **HENBANE.** *HYOSCYAMUS*.

Coarse, usually hairy annuals or biennials. Corolla obliquely campanulate or shortly funnel-shaped, 5-lobed. Capsule enclosed in the enlarged calyx, bursting when ripe round a circular raised ring immediately below the hardened top.

1. Common Henbane. *Hyoscyamus niger*, Linn. (Fig. 707.)

(Eng. Bot. t. 591.)

A coarse, erect, branching annual, 1 to 2 feet high, more or less hairy and viscid, with a nauseous smell. Leaves rather large, sessile; the upper ones clasping the stem, ovate, and irregularly pinnatifid. Flowers very shortly stalked; the lower ones in the forks of the

branches; the upper ones sessile, in one-sided leafy spikes, rolled back at the top before flowering. Calyx short when in flower, but persists round the fruit, and then an inch long, strongly veined, with 5 stiff, broad, almost prickly lobes. Corolla above an inch long, pale dingy-yellow, with purplish veins. Capsule globular, with numerous small seeds.

In waste, stony places, on roadsides, etc., in central and southern Europe and western Asia, and having been formerly much cultivated for its medicinal properties has spread far into northern Europe. In Britain, chiefly on rubbish and waste places, about villages and old castles, in England, southern Scotland, and Ireland. *Fl. summer.*



Fig. 707.

III. **SOLANUM.** SOLANUM.

Herbs, shrubs, or, in exotic species, low trees; the flowers usually in cymes, on short, lateral or terminal peduncles. Calyx of 5 or rarely more divisions. Corolla rotate, 5-lobed, with scarcely any tube. Anthers almost sessile, closed or joined together in an erect cone round the style in the centre of the flower, each anther opening in a small pore at the top. Fruit a berry, with several seeds.

A very large genus, widely spread over the globe, but chiefly in tropical regions, and more especially in South America.

Climber, shrubby at the base. Leaves slightly cordate

or 3-lobed 1. *Bittersweet S.*

Erect annual or biennial. Leaves ovate, angularly toothed 2. *Black S.*

The cultivated species include the *Potato* (*S. tuberosum*), the *Tomato* or *Love-apple* (*S. Lycopersicum*), the *Egg-plant* or *Bringall* (*S. Melongena*), and several ornamental ones.

1. **Bittersweet Solanum.** *Solanum Dulcamara*, Linn.

(Fig. 708.)

(Eng. Bot. t. 565. *Bittersweet* or *Nightshade*.)

Stem shrubby at the base, with climbing or straggling branches,



Fig. 708.

often many feet in length, but dying far back in winter. Leaves stalked, ovate or ovate-lanceolate, 2 or 3 inches long, usually broadly cordate at the base and entire, but sometimes with an additional smaller lobe or segment on each side, either quite glabrous or downy on both sides as well as the stem. Flowers rather small, blue, with yellow anthers, in loose cymes, on lateral peduncles shorter than the leaves. Berries small, globular or ovoid, and red.

In hedges and thickets, in moist shady situations, all over Europe, except the extreme north, represented all across Russian Asia by a closely allied species or perhaps a mere variety. Generally diffused over England and Ireland, but more rare in Scotland. *Fl. summer.*

2. Black Solanum. *Solanum nigrum*, Linn. (Fig. 709.)

(Eng. Bot. t. 566.)



Fig. 709.

An erect annual or biennial, with very spreading branches, about a foot high; in Britain usually glabrous or nearly so, but on the Continent often hairy or rough on the angles. Leaves stalked, ovate, with coarse angular teeth. Flowers small and white, in little cymes almost contracted into umbels, on short, lateral peduncles. Berries small, globular, usually black, but sometimes, especially on the Continent, green, yellow, or dingy-red.

One of the widest-spread weeds over every part of the globe, except the extreme north and south; varying so much in warmer regions as to have been described under more than forty names. Common in some parts of England and Ireland, but scarcely found in Scotland, except when accidentally introduced with cultivation. *Fl. the whole summer and autumn.*

IV. **ATROPA.** ATROPA.

Calyx broadly campanulate, deeply 5-lobed. Corolla campanulate, regular. Fruit a berry.

A genus confined by some to the single European species, but extended by others to include several herbs or shrubs from warmer climates, of no interest to the British botanist.

1. **Deadly Atropa.** *Atropa Belladonna*, Linn. (Fig. 710.)

(Eng. Bot. t. 592. *Dwale* or *Belladonna*.)

An erect, glabrous or slightly downy herb, with a perennial rootstock and branching stem. Leaves stalked, rather large, ovate and entire, with a smaller one usually proceeding from the same point, often so small as to look like a stipule. Flowers solitary, on short peduncles, in the forks of the stem or in the axils of the leaves. Corolla pale purplish-blue, nearly an inch long, with 5 broad, short lobes. Stamens shorter, with distinct filaments. Berry rather large, globular.

In waste, stony places, in southern Europe and west central Asia, extending over central Europe, chiefly about old castles and ruins. In Britain, it is only found in similar localities in southern England, and a few stations further north, probably the remains of former cultivation. *Fl. summer.*

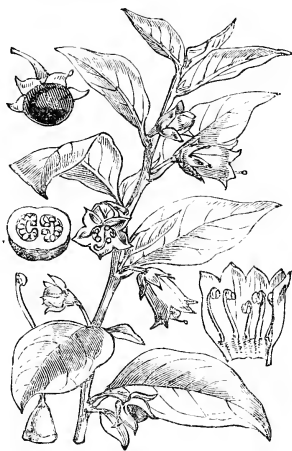


Fig. 710.

LIII. **BROOMRAPE FAMILY.** OROBANCHACEÆ.

Herbs, of a brown or purplish colour, passing into yellow or blue, but never green, always parasitical on the roots of other herbs or shrubs; the stems simple or rarely branched, erect, bearing scales of the same colour instead of leaves, and a terminal spike of flowers, each in the axil of a bract, similar to the scales of the stem, and accompanied often by a pair of smaller bracts at the

base of the calyx. Calyx variously divided, usually into 2 or 4 lobes or sepals. Corolla broadly tubular or campanulate, often curved, the lobes more or less 2-lipped. Stamens 4, in 2 pairs. Anthers 2-celled, the cells parallel, and usually pointed at the lower end. Style single, with a 2-lobed stigma. Ovary and capsule 1-celled, the latter opening in 2 valves, with numerous small seeds attached to parietal placentas.

A small Order, spread over the greater part of the globe, but chiefly in temperate climates, and more abundant in the old world than in America. The floral characters are nearly those of the *Scrophularia* family, with the exception of the ovary and capsule, which are never divided into cells, the placentas not joining in the centre. The absence of green leaves at once distinguishes it from all British species of that family.

Calyx deeply divided into 2 or 4 pointed sepals 1. BROOMRAPE.
Calyx with 4 broad, short teeth or lobes 2. LATHRÆA.

I. BROOMRAPE. OROBANCHE.

Calyx divided to the base on the upper side, and often also on the lower side, so as to form 2 lateral sepals, either entire or 2-cleft, either distinct from each other, or more or less connected at the base on the lower side, and sometimes on the upper side also, by the intervention of a fifth lobe, and always pointed. Habit and other characters those of the family.

It is the principal genus of the Order, extending over the whole of its geographical range. The species are in general difficult to characterize. Some appear to thrive only on the roots of one species, or at most two or three closely allied ones, whilst others will grow on a great variety of plants of the most remote natural affinities. But as the particular stock the plant feeds on, occasions some modification in the habit of the parasite, it is in many cases a matter of great doubt whether the differences observed are owing to this circumstance or to real specific distinction. It is not therefore improbable that some of the species here adopted, although much less numerous than those usually distinguished, may on a more careful observation prove to be mere varieties of each other.

One bract only under each flower. Plant with little or no blue.

Stout plant, 1 to 3 feet high, with numerous flowers in a dense spike.

Plant dingy-brown, on shrubby *Peaflowers*. Stamens glabrous below 1. *Great B.*

- Plant more or less yellow, on *Centaurea* and other herbs. Stamens hairy below 4. *Tall B.*
- Plant seldom above a foot high. Spike short, or with the lower flowers distant.
- Plant of a dingy brown, or with a reddish tint. Tube of the corolla broad.
- Calyx of 2 entire or unequally divided sepals.
- Plant red-brown, on *Thyme* 3. *Red B.*
- Calyx of 2 equally divided sepals. Plant light or dark brown, on *Galium* 2. *Clove-scented B.*
- Plant of a light yellowish-brown or purplish, the flowers often tinged with blue. Tube of the corolla narrowed above the base 5. *Lesser B.*
- Three bracts to each flower, one underneath, and a small one on each side. Plant often bluish.
- Stem always simple. Calyx 5-toothed or -lobed . . . 6. *Blue B.*
- Stem often branched. Calyx 4-toothed or -lobed . . . 7. *Branched B.*

1. **Great Broomrape.** *Orobanche major*, Linn. (Fig. 711.)
(Eng. Bot. t. 421.)

This, our largest species, as it is first developed is of a pale yellow, but very soon assumes in every part a dingy purplish-brown colour. Stem simple, stout, from 1 to 1½ or 2 feet high, much thickened at the base, with lanceolate scales, which are much shorter and broader at the base of the plant. Flowers closely sessile, with one bract to each, forming a dense spike at least half the length of the whole plant. Calyx more or less deeply divided into 2 or 4 lanceolate lobes. Corolla $\frac{3}{4}$ to 1 inch long; the tube nearly as broad as long, curved, with a very oblique limb; the upper lip entire or shortly 2-lobed, the lower one 3-lobed, with the middle lobe usually, but not always larger than the lateral ones, and all the lobes toothed and wavy, although less so than in many species. The upper part of the style and stamens are usually covered with short glandular hairs, which are wanting in the lower parts.



Fig. 711.

On the roots of shrubby *Peaflower* plants, scattered over nearly the whole of Europe. Not uncommon in some parts of England, chiefly on *Broom*, more rarely on *Furze*. *Fl.* early summer.

2. Clove-scented Broomrape. *Orobanche caryophyllacea*, Sm. (Fig. 712.)

(Eng. Bot. Suppl. t. 2639.)



Fig. 712.

The colour of the plant and size of the flowers are those of the *greater B.*, but the stem is seldom above 8 or 9 inches high; the flowers are much fewer, and further apart; the tube of the corolla is not quite so broad; the upper lobes scarcely spreading, and the lower ones nearly equal, and the stamens more hairy at the base. The flowers are usually sweet-scented.

Said to grow exclusively on *Galiums*; common on the continent of Europe, extending across the whole of Asia. In Britain limited hitherto to a very few of the southern counties of England. *Fl.* early summer.

3. Red Broomrape. *Orobanche rubra*, Sm. (Fig. 713.)

(Eng. Bot. t. 1786, not good.)

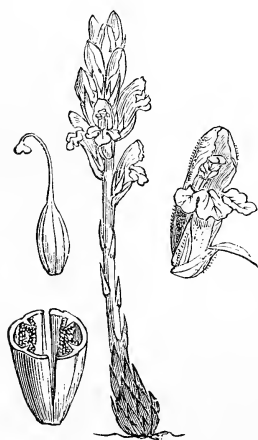


Fig. 713.

A rather smaller plant than the *clove-scented B.*, which it resembles in the shape of the flowers, but these are nearer the size of those of the *lesser B.*, and the whole plant assumes a very red-brown colour. Calyx usually divided into 2 entire sepals with narrow points, but these are sometimes again divided, although very unequally, or united in front at the base, as in the *lesser B.* and other species.

On the roots of *Thyme*, in central and southern Europe. In Britain, only on the basalt and trap-rocks in Scotland and Ireland. *Fl.* summer.

4. Tall Broomrape. *Orobanche elatior*, Sutt. (Fig. 714.)

(Eng. Bot. t. 568.)

Closely resembling the *greater B.* in stature and flowers, of which it is probably a mere variety. It retains longer its pale-yellow colour; the lobes of the corolla are less unequal and more toothed, and the stamens are hairy in their lower part, and nearly glabrous above.

On the *greater Centaurea*, and not on *Peaflower* shrubs; said to be more abundant than the *greater B.* in eastern Europe, but rare in England. *Fl. summer.*

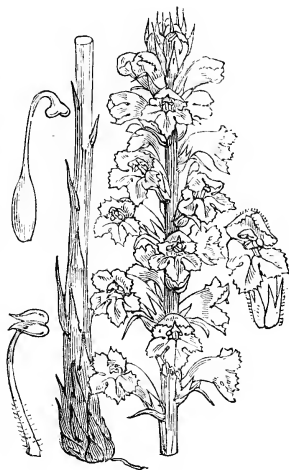


Fig. 714.

5. Lesser Broomrape. *Orobanche minor*, Linn. (Fig. 715.)

(Eng. Bot. t. 422.)

Often small, and always more slender than any of the preceding species, with smaller flowers. Generally of a light brown or yellowish colour, with more or less of bluish-purple in the flowers, although not running into the deep purple-blue of the two following species. It is usually from 6 to 9 inches high, although some of the larger specimens exceed a foot; the lower flowers of the spike are at some distance from each other. Segments of the calyx ending in long, slender points. Tube of the corolla contracted in the middle, much curved; the lobes of the limb larger in proportion, and more wavy than in the



Fig. 715.

greater and the *clove-scented B.* Stamens more or less hairy in their lower part.

One of the widest-spread species over Europe and Russian Asia, growing on a great variety of plants. In Britain, not uncommon in southern and central England, and southern Ireland. *Fl. all summer.* It varies according to station, and the plants it affects. Many of these varieties have been considered as species, amongst which three are commonly admitted into the British Floras:—*O. Picridis* (Eng. Bot. Suppl. t. 2956), a tall, very pale-coloured variety, growing on the *Hawkweed Picris*; *O. amethystea*, assuming a bluer tint than any of the others, and growing on *Eryngium*; *O. Hederæ* (*O. barbata*, Eng. Bot. Suppl. t. 2859), not uncommon on *Ivy* in the south of England and Ireland as on the Continent. It is said to differ from the common form in the yellow, not purple, colour of the stigma, and other trifling characters, which however do not appear to be at all constant.

6. Blue Broomrape. *Orobanche cærulea*, Vill. (Fig. 716.)

(Eng. Bot. t. 423.)



Fig. 716.

Stem simple or rarely branched, 6 to 9 inches high, with a light-bluish tint. Flowers of a deep purplish-blue, with two small bracts at the base, one on each side, besides the larger bract common to all *Broomrapes*. Calyx usually closed at the back by a fifth tooth or lobe, much shorter and broader than the others. Corolla-tube rather long and curved; the 5 lobes, although arranged in two lips, are less unequal, and less wavy than in the preceding species.

Chiefly, if not exclusively, on the *Milfoil Achillea*; not uncommon on the continent of Europe, and in west-central Asia. In Britain, only in grassy pastures near the sea, in Norfolk, and in the Channel Islands. *Fl. early summer.*

The *O. arenaria*, a larger plant, of a paler blue, parasitical on *Artemisias* in light, sandy soils, is said to have been found also in Jersey; but all the specimens so named from that island which I have seen, have proved to be the *blue B.*

7. Branched Broomrape. *Orobanche ramosa*, Linn.

(Fig. 717.)

(Eng. Bot. t. 184.)

Very much smaller than the *blue B.*, of a pale straw-colour, with smaller pale-blue flowers. Stem often branched, seldom above 6 inches high. Flowers shaped like those of the *blue B.*, and, like them, they have two small lateral bracts besides the larger one; but the calyx is split at the back, and has only 4 lobes, as in the brown *Broomrapes*.

On Hemp, Lucern, and some other crops, chiefly in southern Europe, and has been found, though very rarely, in some of the southern and eastern counties of England. *Fl. summer*.



Fig. 717.

II. **LATHRÆA.** LATHRÆA.

A single species, closely allied to the *Broomrapes*, but the flowers more regular, the calyx broadly campanulate or inflated with 4 short broad lobes, and the placentas to which the seeds are attached in the capsule are more fleshy.

1. Common Lathræa. *Lathræa squamaria*, Linn.

(Fig. 718.)

(Eng. Bot. t. 50. *Toothwort*.)

A pale rose-coloured plant, with flesh-coloured or slightly bluish flowers, streaked with purple or dark-red. Rootstock fleshy and creeping, covered with close-set, short, thick, fleshy scales. Flowering stems erect, from 3 or 4 inches to near a foot high, with a few broad, orbicular, much less fleshy scales, passing gradually into the bracts.



Fig. 718.

Flowers numerous and nodding, in a dense spike, or sometimes shortly stalked. Calyx about 5 lines long. Corolla half as long again, the upper lip entire or slightly notched. Stamens and style nearly as long as the corolla, or sometimes, especially the style, projecting beyond it.

On the roots of trees, especially the *Hazel*, throughout Europe and central and Russian Asia, except the extreme north. Not uncommon in England and Ireland, and extends into the southern counties of Scotland. *Fl. early spring.*

LIV. THE SCROPHULARIA FAMILY. SCROPHULARINEÆ.

Herbs, or in some exotic species shrubs, with opposite or alternate leaves, and no stipules. Calyx persisting round the fruit, usually with 5 teeth or segments, sometimes fewer. Corolla monopetalous, usually 2-lipped, but sometimes nearly regular, with 4, 5, or rarely more lobes, always overlapping one another in the bud. Stamens usually 2 or 4, in 2 pairs, very rarely 5, inserted in the tube of the corolla. Ovary and capsule divided into 2 cells, with several seeds in each cell. Style simple, usually ending in a 2-cleft stigma.

A numerous family, widely diffused over the globe, from the Arctic Circle to the tropics, although more abundant in temperate regions than in the extremes of heat or cold, and generally speaking, well marked by the two-lipped or *personate* corolla, the stamens in pairs, and the seeds more than one in each cell of the capsule; but there are some anomalous genera in which these characters are much modified, and two large and natural exotic families, the *Bignonia* and *Acanthus* families, are only to be accurately distinguished from *Scrophularineæ* by an

attentive study of minute characters. To the first of these belong the *Bignonias* and *Tecomas* of our hothouses, as well as the *Catalpa*, often planted in our gardens, and (if taken in its most extended sense) the numerous hothouse *Gesnerias*, *Gloxinias*, *Achimenes*, etc. The *Acanthaceæ* include *Justicias*, *Ruellias*, and many modern hothouse genera with long names, besides the European *Acanthus*, which gives its name to the family.

Corolla rotate or concave, with a very short tube.

Stamens 2. Corolla 4-cleft, never yellow 9. VERONICA.

Stamens 4 or more.

Tall, coarse, erect plants. Stamens 5, often woolly 1. MULLEIN.

Small or creeping plants. Stamens 4, glabrous.

Glabrous, almost stemless plant, with radical leaves
and minute clustered flowers 6. LIMOSIL.

Slender, creeping, hairy plant, with orbicular, al-
ternate leaves, and axillary, stalked flowers 7. SIBTHORPIA.

Corolla with a distinct tube.

Tube of the corolla with a spur or protuberance at
the base, the mouth closed by a projecting palate.

Tube of the corolla spurred 3. LINARIA.

Tube of the corolla with a slight protuberance at the
base 2. SNAPDRAGON.

Tube of the corolla straight at the base; the mouth open
(except in *Melampyrum*).

*Calyx with 5 lobes or teeth, or 2 or 3 leafy jagged
lobes.*

Corolla nearly globular, small, dingy, with 5 un-
equal lobes, not 2-lipped 4. SCROPHULARIA.

Corolla more than an inch long, with a broad tube,
and flat, spreading lobes.

Flowers red or white, in a long terminal spike.

Leaves alternate 8. FOXGLOVE.

Flowers yellow, on axillary peduncles. Leaves
opposite 5. MIMULUS.

Corolla less than an inch long, the tube slender or
short.

Calyx inflated after flowering. Upper lip of the
corolla laterally compressed 13. PEDICULARIS.

Calyx tubular or campanulate. Upper lip of the
corolla with two spreading lobes 11. EYEBRIGHT.

Calyx with 4 lobes or teeth.

Upper lip of the corolla arched or with spreading
lobes. Anther-cells pointed at the lower
end.

Upper lip of the corolla nearly entire, arched or
concave 10. BARTSIA.

Upper lip of the corolla 2-lobed, spreading . . 11. **EYEBRIGHT.**

Upper lip of the corolla much compressed laterally.

Anther-cells obtuse.

Calyx much inflated, the teeth small . . . 12. **RATTLE.**

Calyx tubular or campanulate, toothed or lobed 14. **MELAMPYRE.**

These British genera belong to two of the three principal Tribes or Suborders of the family, viz. :—

Tribe *Antirrhineæ*. Upper lip or outer lobe of the corolla outside the others in the bud. *Genera* :—1. **MULLEIN**; 2. **SNAPDRAGON**; 3. **LINARIA**; 4. **SCROPHULARIA**; and 5. **MIMULUS**.

Tribe *Rhinantheæ*. Upper lip or upper lobe of the corolla wholly or partially inside the others in the bud. *Genera* :—6. **LIMOSSEL**; 7. **SIBTHORPIA**; 8. **FOXGLOVE**; 9. **VERONICA**; 10. **BARTSIA**; 11. **EYEBRIGHT**; 12. **RATTLE**; 13. **PEDICULARIS**; and 14. **MELAMPYRE**.

Among the exotic genera cultivated in our gardens may be mentioned, *Browallia*, *Brunsfelsia*, *Salpiglossis*, and *Schizanthus*, belonging to the wholly exotic tribe *Salpiglossideæ*; and *Calceolaria*, *Alonsoa*, *Angelonia*, *Maurandia*, *Lophospermum*, *Paulownia*, *Collinsia*, *Pentstemon*, *Torenia*, and several others of the tribe *Antirrhineæ*. The exotic genera of *Rhinantheæ*, with the exception of a few allied to *Veronica* and *Foxglove*, are mostly parasitical, and therefore, although very handsome, not in cultivation.

I. **MULLEIN.** VERBASCUM.

Tall, erect, stiff herbs, often woolly; with coarse, alternate leaves, more or less toothed; and yellow, white, or rarely purple flowers, either solitary under each bract or in short dense cymes or branches, forming terminal, simple spikes or branched panicles. Calyx deeply 5-cleft. Corolla rotate or concave, with a very short tube, and 5 broad, rounded lobes. Stamens 5, with all the filaments woolly or the two lower ones glabrous. Capsule ovoid, opening at the partition in two valves, with very numerous small seeds.

The genus extends over Europe and northern and central Asia, but is most abundant in the Mediterranean region, where the species vary much, besides frequently producing natural hybrids, so that their distinction has become very complicated. The few British species are however more easily recognized.

Leaves decurrent on the stem, very woolly. Flowers in a dense,

simple spike 1. *Great M.*

Leaves not decurrent or the upper ones very slightly so. Flowers in a raceme or panicle.

Plant glabrous or slightly glandular-hairy. Two stamens longer than the others, with long anthers. Flowers large, one or few to each bract. (Raceme usually simple.)

Pedicels mostly longer than the calyx 2. *Moth M.*

Pedicels shorter than the calyx 3. *Twiggy M.*

Plant with more or less white cottony down or wool, especially on the calyx and under side of the leaves. Flowers rather small, several to each bract.

Lower leaves cordate at the base. Raceme nearly simple.

Hairs of the filaments yellow 4. *Dark M.*

Lower leaves narrowed at the base. Racemes paniced.

Hairs of the filaments white.

Down short and powdery. Upper side of the leaves nearly glabrous 5. *White M.*

Down a mealy wool, easily rubbed off, on both sides of the leaves 6. *Hoary M.*

1. Great Mullein. *Verbascum Thapsus*, Linn. (Fig. 719.) (Eng. Bot. t. 549.)

A stout, erect biennial, simple or branched, 2 to 4 feet high, clothed with soft woolly hairs. Leaves oblong, pointed, slightly toothed, narrowed at the base into two wings running a long way down the stem; the lower ones often stalked, and 6 or 8 inches long or more. Flowers in a dense, woolly terminal spike, sometimes a foot or more long. Corolla yellow, usually 6 to 9 lines diameter, slightly concave; 3 of the filaments are covered with yellowish woolly hairs, and have short 1-celled anthers; the 2 longer stamens glabrous or nearly so, with longer anthers adnate to the filaments. Capsule thick, rather longer than the calyx.

Common on roadsides and waste places, all over Europe and temperate Asia to the Caucasus, Altai, and Himalaya, and now naturalized in America. Frequent in Britain, extending as far north as Aberdeen. *Fl. summer.* A variety with a much larger and flatter corolla and longer anthers to the long stamens, not uncommon on the Continent, where botanists give it the name of *V. thapsiforme*, but which is believed by some to be the original form described by Linnæus, is said to have been found also in Kent.



Fig. 719.

2. Moth Mullein. *Verbascum Blattaria*, Linn. (Fig. 720.)
(Eng. Bot. t. 393.)



Fig. 720.

A tall biennial, not quite so stout as the *great M.*, sometimes branched, and either glabrous or with a few glandular hairs in the upper part. Leaves oblong, coarsely toothed or sinuate; the lower ones stalked, the middle ones sessile, the upper ones clasping the stem or shortly decurrent. Flowers yellow or rarely white, in a long, loose, simple raceme; the pedicels from 3 to 6 lines long, either solitary or rarely two together in the axil of a green bract. Hairs of the filaments purple.

On banks and edges of fields, in central and southern Europe, Russian and central Asia, and naturalized in North America, but not extending into Scandinavia. Indicated in several counties of England and southern Ireland, but

generally regarded as an introduced plant, except perhaps near the southern coast. *Fl. summer and autumn.*

3. Twiggy Mullein. *Verbascum virgatum*, With. (Fig. 721.)
(Eng. Bot. t. 550.)



Fig. 721.

This may be a mere variety of the *moth M.*, but the glandular hairs are more abundant, and the pedicels of the flowers are very short, usually from 2 to 6 together under each bract.

Apparently limited on the Continent to western and central Europe, and generally less common there than the *moth M.*, although it has established itself here and there as a weed of cultivation in northern as well as tropical America and other distant lands. Rather more frequent in England than the *moth M.*, but very rare and probably introduced only in Ireland. *Fl. summer and autumn.*

4. **Dark Mullein.** *Verbascum nigrum*, Linn. (Fig. 722.)
(Eng. Bot. t. 59.)

Stem sparingly clothed with woolly hairs, 2 to 3 feet high, ending in a long, simple or slightly branched raceme. Leaves crenate, nearly glabrous on the upper side, slightly woolly underneath; the lower ones large, cordate-oblong, on long stalks; the upper ones nearly sessile, small, and pointed. Flowers numerous between each bract, more or less stalked, smaller than in the last three species. Corolla yellow, with bright-purple hairs to the filaments.

On banks and waysides, all over Europe and western Asia, except the extreme north. Truly indigenous in central and southern England, but believed to be naturalized only in northern England and southern Scotland, and not indicated in Ireland. *Fl. summer and autumn.*



Fig. 722.

5. **White Mullein.** *Verbascum Lychnitis*, Linn. (Fig. 723.)
(Eng. Bot. t. 58.)

About the size of the *dark M.*, or rather taller. Stem-leaves nearly sessile, the lower ones narrowed into a short footstalk, all nearly glabrous above, but covered underneath with a short, white, powdery down, which is also sprinkled over the stem, and more conspicuous on the calyxes. The racemes form a narrow, branching panicle, with erect branches. Flowers numerous, pale-yellow or nearly white, the size of those of the *black M.* Hairs of the filaments white.

On banks and waysides, in Europe and western Asia, extending northwards into Scandinavia. In Britain, scattered over several parts of England and southern Scotland, but by no means a common plant. *Fl. summer.*



Fig. 723.

6. Hoary Mullein. *Verbascum pulverulentum*, Vill.

(Fig. 724.)

(Eng. Bot. t. 487.)



Fig. 724.

A stately species, growing often to the height of 3 feet or more, terminating in a long, stiff, pyramidal panicle, with spreading branches, and remarkable for the mealy white wool which clothes the whole plant but is easily rubbed off. Leaves sessile or the lower ones narrowed into a short footstalk, broadly oblong and crenate. Flowers numerous in small clusters, about the size of the last two species, yellow, with white hairs to the filaments.

On roadsides, and dry, stony wastes, in central and especially southern Europe, not extending so far east as the preceding species, nor into northern Germany. In Britain, apparently confined to Norfolk, Suffolk, Surrey, and Hants. *Fl. summer.*

II. **SNAPDRAGON.** ANTIRRHINUM.

Herbs, with the lower leaves often opposite, the upper ones alternate, and the flowers, often showy, solitary in the axils of the upper leaves, or forming terminal racemes. Calyx deeply 5-cleft. Corolla with a broad tube, slightly protruding below the calyx on the lower side, but not spurred, as in *Linaria*; the divisions of the limb arranged in two lips, with a projecting *palate* closing the mouth. Capsule oblique, 2-celled, opening at the top, by 2 or 3 pores.

The species are not numerous, chiefly confined to the Mediterranean regions, or more especially to south-western Europe.

Perennial, with showy flowers. Sepals broad and short . . . 1. *Great*

Annual. Sepals narrow, as long as the corolla 2. *Lesser S.*

1. **Great Snapdragon.** *Antirrhinum majus*, Linn.

(Fig. 725.)

(Eng. Bot. t. 129.)

Stem perennial at the base, forming a leafy tuft; the flowering branches erect, 1 to 2 feet high, glabrous or slightly downy, often

branched. Leaves narrow, lanceolate or linear, entire. Flowers large, purplish-red (or, in gardens, white or variegated). Segments of the calyx broad and obtuse, not above 3 lines long. Corolla above an inch long, the so-called palate opening when the tube is pressed laterally between the finger and thumb, whence the popular name of the genus.

In clefts of rocks, old walls, and stony places, in the Mediterranean region, but, being much cultivated in gardens, it has become naturalized much further north, and is frequently found in similar situations in southern England and Ireland. *Fl. summer and autumn.*



Fig. 725.

2. Lesser Snapdragon. *Antirrhinum Orontium*, Linn. (Fig. 726.)

(Eng. Bot. t. 1155.)

An erect annual, seldom above a foot high, much more slender than the *great S.*, with narrower leaves. Flowers scarcely 6 lines long, mostly in the axils of the upper leaves; the narrow, unequal segments of the calyx as long as or longer than the corolla.

Apparently indigenous in southern Europe, and widely spread as a weed of cultivation over the greater part of Europe and central Asia, and carried out to other countries. In Britain, it extends over southern and eastern England and southern Ireland. *Fl. summer.*



Fig. 726.

III. **LINARIA.** LINARIA.

This genus only differs from *Snapdragon* in the tube of the corolla, which is projected at the base into a conical or cylindrical spur. The species are more numerous, and the geographical range rather wider, but still the greater number are from southern and especially southwestern Europe.

Stems erect or ascending. Leaves linear, oblong or rarely ovate, entire.

Flowers yellow.

Stems 1 to 3 feet high, erect from the base 1. *Common L.*

Stems scarcely 6 inches high, diffuse at the base . . 4. *Supine L.*

Flowers blue or purplish or striped.

Perennial. Flowers on short pedicels, in terminal racemes. Spur short and conical 2. *Pale L.*

Annual. Flowers on short pedicels, in a short terminal raceme. Spur long and slender 3. *Pelisser's L.*

Annual. Flowers small, on long axillary pedicels. Spur short and conical 5. *Lesser L.*

Stems trailing. Leaves ovate, orbicular, or angular.

Plant quite glabrous. Leaves 5-lobed, with palmate nerves 6. *Ivy L.*

Plant hairy. Leaves ovate or angular, with pinnate nerves.

Leaves ovate or orbicular, very hairy. Peduncles hairy. Sepals broad 7. *Round-leaved L.*

Leaves angular or hastate at the base, slightly hairy.

Peduncles glabrous and slender. Sepals narrow . 8. *Pointed L.*

L. purpurea, a tall Italian species, with narrow leaves, and a long raceme of small purple flowers, has become almost naturalized in the south of the Isle of Wight, and several other species, such as *L. triphylla* and *bipartita*, cultivated in our flower-gardens, will occasionally sow themselves in the vicinity, but soon disappear again.

1. **Common Linaria.** *Linaria vulgaris*, Mœnch. (Fig. 727.)

(*Antirrhinum Linaria*, Eng. Bot. t. 658. *Toadflax*.)

Rootstock shortly creeping. Stems erect, 1 to 3 feet high, of a glaucous green, and usually glabrous, except a few glandular hairs amongst the flowers. Leaves crowded, linear or narrow-lanceolate. Flowers large and yellow, forming a short but handsome terminal panicle. Calyx small. Spur of the corolla long and pointed; the projecting palate of the lower lip of a bright orange-colour, completely closing

the tube. Capsule large and ovoid, with numerous rough seeds, surrounded by a narrow, scarious border.

In hedges, and on the borders of fields, in Europe and Russian Asia, and has been carried out with European crops to other parts of the world. Abundant all over the British Isles, excepting the Scotch Highlands, where it is more rare. *Fl. summer and autumn.* A singular deformity, called *Peloria*, occurs sometimes, in which the corollas are regular, with 5 spurs. Varieties are also occasionally found with smaller flowers, either yellow or striped, and without the border to the seeds. They are very rare, and supposed to be hybrids between this and the following species.

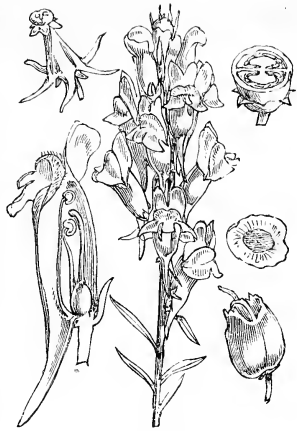


Fig 727.

2. Pale Linaria. *Linaria repens*, Ait. (Fig. 728.)

(*Antirrhinum*, Eng. Bot. t. 1253.)

Rootstock slender, and creeping to a considerable extent; the stems erect or decumbent at the base, from 8 or 10 inches to above 2 feet high, and glabrous. Leaves crowded or whorled at the base of the stem, scattered in the upper part. Flowers rather small but pretty, and slightly sweet-scented, forming short racemes, usually arranged in a terminal panicle. Corolla under 6 lines long, nearly white, but striped with bluish or purple veins; the spur usually very short and conical, but variable in length. Seeds wrinkled, without any scarious border.

In stony wastes, in southern and central Europe to the Caucasus, scarcely extending into Germany. Rare in Britain, occurring here and there in southern England and Ireland, or further north only as a straggler from gardens, where it was formerly frequently cultivated. *Fl. summer and autumn.*



Fig. 728.

3. Pelisser's Linaria. *Linaria Pelisseriana*, DC. (Fig. 729.)

(Eng. Bot. Suppl. t. 2832.)



Fig. 729.

An erect, glabrous, slender annual, scarcely branched, with very narrow linear leaves, few and distant. Flowers small, in a short terminal raceme; the corolla purple, with dark veins, and a long, slender-pointed spur.

In bushy wastes, and pastures, in western and southern Europe, along the Mediterranean region to the Caucasus, extending here and there into central Europe, and has been gathered in the Isle of Jersey. *Fl.* June.

4. Supine Linaria. *Linaria supina*, Desf. (Fig. 730.)



Fig. 730.

Perennial stock short, with numerous branches, seldom 6 inches long, decumbent at the base, simple or nearly so, glabrous or with a slight glandular down. Leaves linear; the lower ones and those of the barren stems whorled. Flowers yellow, in a short terminal raceme, rather smaller than in the *common L.*, with a long, slender spur. Seeds nearly flat, with a scarious wing.

In sandy or stony places, especially near the sea, in western Europe and the west Mediterranean region. Very abundant in southern France and Spain, extending up the western coast to the Channel, and occasionally found in Devonshire and Cornwall. *Fl.* summer.

5. Lesser Linaria. *Linaria minor*, Desf. (Fig. 731.)

(Eng. Bot. t. 2014.)

A much branched, erect annual, 3 or 4 inches high, with a slight

glandular down. Leaves, although linear, yet broader and more obtuse than in any of the preceding species, and narrowed at the base. Flowers very small, on long axillary peduncles; the corolla scarcely exceeding the calyx, of a pale purple or violet colour, with a short blunt spur. Seeds small, not bordered.

In waste and cultivated places, in temperate and southern Europe, extending northward far into Scandinavia and eastward to the Caucasus. In Britain, not unfrequent as a weed of cultivation in southern England, more rare in the north, in Ireland, and in Scotland. *Fl. summer.*



Fig. 731.

6. Ivy Linaria. *Linaria Cymbalaria*, Mill. (Fig. 732.)

(*Antirrhinum*, Eng. Bot. t. 502.)

A perfectly glabrous, trailing perennial, with slender stems, often rooting at the nodes. Leaves stalked, broad, almost reniform, broadly 5-lobed, rather thick, and faintly marked with 3 or 5 palmate veins. Flowers small, solitary, on recurved axillary peduncles, of a pale lilac, with a rather short spur; the palate yellowish, closing the tube. Capsule nearly globular, containing several warted but not winged seeds.



Fig. 732.

On rocks, old walls, and stony places, in the Mediterranean region, and now naturalized in many parts of central and even northern Europe. In Britain, perfectly established in several counties of England and Ireland. *Fl. the whole season.*

7. Round-leaved Linaria. *Linaria spuria*, Mill. (Fig. 733.)

(*Antirrhinum*, Eng. Bot. t. 691.)

A very hairy annual, with slender, branching, prostrate stems, 2 or 3 inches to a foot or more long. Leaves nearly sessile, broadly ovate



Fig. 733.

8. **Pointed Linaria.** *Linaria elatine*, Desf. (Fig. 734.)

(*Antirrhinum*, Eng. Bot. t. 692.)



Fig. 734.

or orbicular. Flowers solitary, on hairy peduncles, in the axils of the upper smaller leaves. Sepals ovate or broadly lanceolate. Corolla very small, yellowish, with a purple upper lip; the spur slender and recurved. Seeds warted, without wings.

In waste and stony places, in the Mediterranean region, and as a weed of cultivation in central Europe, but not extending so far north as the *pointed L.* In Britain, only in cultivated places, in southern and central England. *Fl. the whole season.*

A prostrate annual, with the stem and leaves hairy, but less so than in the *round-leaved L.*, which this plant resembles in most respects; the branches are, however, more slender, the leaves angular or hastate at the base, the peduncles much more slender, glabrous, and spreading at right angles, the sepals narrow-lanceolate, and the spur of the corolla straight.

In open woods, and heaths, in cultivated and waste places, in Europe and western and central Asia, extending northwards into southern Sweden. In Britain, chiefly as a weed of cultivation, but probably truly indigenous in southern England and Ireland; rare in the north, and unknown in Scotland. *Fl. the whole season.*

IV. **SCROPHULARIA.** SCROPHULARIA.

Herbs, usually erect, with angular stems, opposite leaves, and rather small flowers, of a dingy purple or yellow, in loose cymes forming

a terminal panicle. Calyx more or less deeply 5-cleft. Corolla nearly globular, with short, broad lobes; the two upper ones erect and united into an upper lip; the two lateral ones often shorter and erect; the lowest one turned downwards. Stamens 4, turned downwards, with 1-celled anthers; a fifth barren stamen usually forming a scale under the upper lip. Capsule 2-celled, opening at the partition in 2 valves.

The species are numerous, having their great centre in the Mediterranean region and in central Asia, a few only extending over the rest of Europe, northern Asia, and a part of North America. The shape of the corolla readily distinguishes the genus from all others.

Leaves glabrous. Panicle almost leafless.

Stem acutely angled but not winged, with numerous knotty tubers at its base. Leaves acute. Border of the sepals very narrow 1. *Knotted S.*

Stem 4-winged, without tubers at the base. Leaves usually obtuse. Sepals with a conspicuous scarious border 2. *Water S.*

Leaves downy. Panicle leafy at the base, or cymes all axillary.

Leaves cordate-triangular. Flowers dull purple, with a scale under the upper lip 3. *Balm-leaved S.*

Leaves orbicular or broadly cordate. Flowers yellow, without any scale under the upper lip 4. *Yellow S.*

1. *Knotted Scrophularia. Scrophularia nodosa*, Linn.

(Fig. 735.)

(Eng. Bot. t. 1544. *Figwort*.)

A coarse, erect perennial, 2 to 3 feet high, glabrous or nearly so, with a disagreeable smell; the short stock emitting a number of small green knots or tubers. Stem sharply quadrangular. Leaves large, broadly ovate or heart-shaped, pointed, and doubly crenate or serrate. Panicle loosely pyramidal or oblong, usually sprinkled with minute glandular hairs. Lobes of the calyx rounded, with a very narrow, often scarcely perceptible, scarious border. Tube of the corolla of a pale greenish-purple, twice as long as the calyx; the upper lip more deeply coloured, much longer than the lateral lobes.

In rather moist cultivated and waste



Fig. 735.

grounds, in Europe, Russian Asia, and some parts of North America. Extends all over Britain. *Fl. all summer.*

2. Water Scrophularia. *Scrophularia aquatica*, Linn.

(Fig. 736.)

(Eng. Bot. t. 854, and *S. Ehrharti*, Eng. Bot. Suppl. t. 2875.)



Fig. 736.

Very variable in size, but is generally taller and rather less branched than the *knotted S.*, which it much resembles in habit and in flowers. The angles of the stem project into narrow wings, there are no tubers at its base, and the leaves are not so broad, and more obtuse. Panicle long and narrow. Lobes of the calyx surrounded by a scarious border, much more conspicuous than in the *knotted S.* Corolla of a dull purple.

In wet places, along ditches and sides of streams, in Europe and Russian Asia. Abundant in Britain. *Fl. summer.* It varies in the shape of the scale or barren stamen under the upper lip of the corolla, in station, and in the more or less acute teeth of the leaves, and two species have been generally distin-

guished: *S. Ehrharti*, a more luxuriant and leafy plant, with the scale much broader than long, and the capsule nearly globular; and *S. Balbisii*, growing in drier situations, the leaves more pointed, the scale often nearly orbicular, and the capsule more ovoid and pointed; but these differences in foliage and capsule do not always correspond with those of the shape of the scale, which will often vary in different flowers of the same plant.

3. Balm-leaved Scrophularia. *Scrophularia Scorodonia*,

Linn. (Fig. 737.)

(Eng. Bot. t. 2209.)

Very nearly allied to the *water S.* in all essential characters, and distinguished chiefly by its downy, wrinkled leaves, and by the panicle more leafy at its base. It is also usually a rather smaller

plant, and the angles of the stem are never expanded into wings, and sometimes scarcely perceptible.

A west European species, extending southwards to Madeira, and northwards to Jersey, the extreme south-west of England and the south of Ireland. *Fl. summer.*

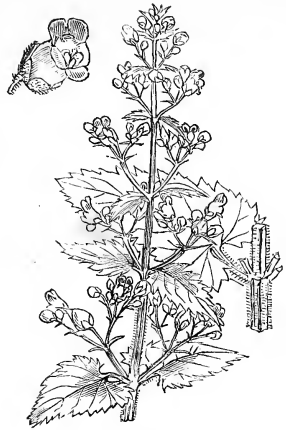


Fig. 737.

4. **Yellow Scrophularia.** *Scrophularia vernalis*, Linn.
(Fig. 738.)

(Eng. Bot. t. 567.)

A hairy perennial, very different in aspect from the three preceding species, and not near so coarse. Stem seldom 2 feet high; the leaves nearly orbicular, cordate at the base, coarsely toothed, and of a light-green colour. Peduncles almost all axillary, bearing a small cyme of yellow flowers; the 4 upper lobes of the corolla nearly of equal size, without any scale or barren stamen inside; the lowest lobe rather larger. Stamens longer than the tube of the corolla.

On roadsides, and waste or stony places, in the hilly districts of Europe, extending from France to the Caucasus. Occasionally found in England, but in most cases supposed to have been introduced. *Fl. spring.*



Fig. 738.

V. **MIMULUS.** MIMULUS.

Herbs, with opposite leaves, and yellow, purple, or pink flowers,
VOL. II. K

growing singly on axillary peduncles. Calyx tubular, with 5 prominent angles, and 5 short teeth. Corolla with a broad tube, and 5 flat lobes arranged in two lips; the upper one 2-lobed and sometimes erect, the lower one spreading and 3-lobed, the central lobe often notched. Stamens 4. Capsule opening in 2 valves in the middle of the cells.

An American genus, which, besides the species now naturalized in Europe, comprises the *Musk Mimulus* and some others, occasionally cultivated in our gardens.

1. **Yellow Mimulus.** *Mimulus luteus*, Willd. (Fig. 739.)



Fig. 739.

A perennial, with a shortly creeping rootstock, and erect or ascending stems, either glabrous or slightly downy, seldom above a foot high. Leaves ovate, coarsely toothed, glabrous. Peduncles 2 inches long or more, bearing a showy yellow flower, above an inch long, usually marked inside with several small purple spots at the mouth of the tube, and sometimes with a large purple-red or pink spot upon each lobe.

On the banks of streams, and in moist, shady places, in north-western America and Chili; long cultivated in our flower-gardens, and now naturalized in boggy places in many parts of Britain. *Fl. all summer.*

VI. **LIMOSSEL.** LIMOSELLA.

Small, tufted or floating annuals; the leaves and minute flowers mostly radical. Calyx 5-toothed or -lobed. Corolla regular, campanulate, 5-lobed. Stamens 4. Anthers 1-celled. Capsule globular, with a very thin pericarp, scarcely dehiscent.

Besides our European species the genus comprises but very few from southern Africa and Asia.

1. **Common Limosel.** *Limosella aquatica*, Linn. (Fig. 740.)

(Eng. Bot. t. 357.)

A glabrous annual, forming little tufts of 1 or 2 inches diameter. Leaves on long stalks, oblong and entire, all radical as well as

the minute flowers; or occasionally a few slender stems are developed among the leaves, about an inch long, and bearing at their summit a similar tuft of leaves and flowers. Corolla of a pale rose-colour, scarcely longer than the calyx.

In wet mud, or in places where water has stood, throughout Europe and a great part of Asia, Africa, and North America. Thinly scattered in Britain, and very local in Scotland, but from its small size it may be frequently overlooked. *Fl. summer.*



Fig. 740.

VII. **SIBTHORPIA.** **SIBTHORPIA.**

Slender, hairy, trailing herbs, with alternate leaves, and small, axillary, yellow or pinkish flowers. Calyx of 4 or more divisions. Corolla nearly rotate, with 5 lobes, or one more than the calyx. Stamen of the same number as, or one less than, the lobes of the corolla. Anthers 2-celled. Capsule compressed, divided into 2 cells, and opening in the middle of the cells in 2 valves.

Besides the British species there is one from the Canary Islands, with larger yellow flowers, often cultivated in our gardens under the name of *Disandra prostrata*, and two from the Andes of South America.

1. **Common Sibthorpia.** *Sibthorpia europæa*, Linn. (Fig. 741.)

(Eng. Bot. t. 649.)

A perennial, with a small stock, and very slender creeping stems rooting at the nodes. Leaves small, on slender stalks, orbicular, deeply cordate at the base, crenate, and hairy. Flowers very minute, on short, axillary stalks. Calyx with 4 narrow segments. Corolla scarcely longer, the 2 upper lobes yellowish, the 3 lower broader and pink.

In moist, shady places, along the western coasts of Europe, penetrating eastward to a very few stations round the Mediterranean, and extending north-



Fig. 741.

wards to the Channel Islands, southern Ireland, and the south-west of England. *Fl. summer.*

VIII. FOXGLOVE. DIGITALIS.

Biennials or perennials, with stout, erect, usually simple stems, alternate leaves, and showy flowers, in long, terminal, one-sided, simple racemes. Calyx of 5 unequal sepals or segments. Corolla tubular, contracted above the base, then much inflated, with the limb shortly 4- or 5-lobed; the lateral lobes outside the upper one in the bud, and the lowest usually the longest. Stamens 4. Capsule pointed, opening at the partition in 2 valves, with numerous small seeds.

A European and North Asiatic genus, of which several species besides our own are occasionally cultivated in flower-gardens, especially the yellow *D. grandiflora*.

1. Purple Foxglove. *Digitalis purpurea*, Linn. (Fig. 742.)

(Eng. Bot. t. 1297.)



Fig. 742.

Root usually biennial, but will sometimes form a stock, which will flower a second or even a third time. Radical leaves on long stalks, ovate or ovate-lanceolate, 6 inches long or more, coarsely veined and downy. Flowering stems 2 to 3 or even 4 feet high, with a few alternate shortly-stalked leaves in the lower part, the upper part occupied by a long stately raceme of purple flowers, each $1\frac{1}{2}$ inches long. Four of the calyx-segments broad and leafy, the fifth upper one much narrower and more pointed. Corolla beautifully spotted inside, with 4 short lobes, the lowest about twice the length of the others and hairy inside.

On dry, hilly wastes, and roadsides, in many parts of western and central Europe, northwards into Scandinavia, but almost unknown in limestone districts. Abundant in several parts of Britain. *Fl. spring and summer.*

IX. **VERONICA.** VERONICA.

Herbs (or shrubs in a few exotic species), with opposite stem-leaves, and small flowers, usually blue or white, sometimes arranged in spikes or racemes, or in the axils of alternate floral leaves. Calyx 4- or 5-cleft. Corolla with a very short tube, the limb rotate, deeply 4-cleft, the lower segment the narrowest. Stamens 2. Capsule more or less flattened laterally (at right-angles to the partition), and opening round the edges in 2 valves. Seeds few.

A numerous genus in the northern hemisphere, with a few species spreading into the tropics and far into the southern hemisphere, whilst others are peculiar to Australia and New Zealand. Among the latter the *V. speciosa*, *salicifolia*, *Lindleyana*, and other shrubby or half-shrubby ones are much cultivated in our gardens.

Perennials, with the flowers in leafless spikes or racemes.

Spikes or racemes terminal.

Stem erect, with a long, dense, terminal spike of flowers 1. *Spiked V.*

Stems diffuse or very short. Racemes loose, few-flowered.

Stem shrubby at the base 2. *Rock V.*

Stems herbaceous.

Stem erect or scarcely creeping at the base, 2 or 3 inches high. Flowers very few, in a short spike or head 3. *Alpine V.*

Stem creeping, and rooting at the base. Flowers in loose, often leafy spikes 4. *Thyme-leaved V.*

Racemes axillary.

Plant glabrous.

Leaves linear or lanceolate. Stem diffuse. Racemes few and slender. Capsule very flat, broader than long 8. *Marsh V.*

Leaves lanceolate or oblong. Stem erect. Racemes numerous. Capsule as long or longer than broad 6. *Water V.*

Leaves oblong or ovate, rather thick and obtuse. Stem diffuse 7. *Brookline V.*

Plant more or less hairy.

Leaves much narrowed at the base. Flowers sessile or almost sessile 5. *Common V.*

Leaves ovate, broad or cordate at the base. Flowers rather large and pedicellate.

Stem hairy all round. Capsule broadest in the middle 9. *Mountain V.*

Stem with two opposite lines of long hairs. Capsule broadest towards the top 10. *Germander V.*

Annuals. Flowers all, or at least the lower ones, solitary in the axils of the leaves.

Upper flowers forming a raceme. The upper leaves reduced to bracts.

Plant glabrous, creeping, and rooting at the base.

Seeds ovate 4. *Thyme-leaved V.*

Plant downy or hairy, erect or procumbent, but not creeping. Seeds cup-shaped.

Leaves ovate, coarsely toothed. Pedicels shorter than the calyx 14. *Wall V.*

Leaves deeply cut.

Stems erect. Pedicels shorter than the calyx . 15. *Vernal V.*

Stems decumbent. Pedicels as long as or longer than the calyx 16. *Fingered V.*

All the flowers axillary. The upper leaves like the lower ones, but smaller. Stems procumbent. Seeds flat or nearly so.

Sepals heart-shaped at the base. Leaves rather thick, often long-stalked. Capsule 2- to 4-seeded . 11. *Ivy V.*

Sepals ovate or lanceolate. Leaves short-stalked.

Capsule several-seeded.

Capsule twice as broad as long. Flowers rather large 13. *Buxbaum's V.*

Capsule but little broader than long. Flowers small 12. *Procumbent V.*

1. Spiked Veronica. *Veronica spicata*, Linn. (Fig. 743.) (Eng. Bot. t. 2.)



Fig. 743.

Stock shortly creeping, hard, and almost woody; the stems ascending or erect, 6 inches to a foot high, usually simple. Leaves oblong or the lower ones ovate, downy, and slightly crenate. Flowers of a clear blue or sometimes pale pink, in a dense terminal spike; the lobes of the corolla narrower and less spreading, and the tube more apparent than in any other of the British species.

In hilly pastures, chiefly in limestone districts, over the greater part of the continent of Europe, and northern and western Asia, short of the Arctic regions. Rare in Britain, and chiefly in Suffolk and Cambridgeshire. *Fl. summer.* A larger and broader-leaved variety, sometimes distinguished under the name of *V. hybrida* (Eng. Bot. t. 673),

occurs in Somersetshire and in some other western counties; and numerous varieties of this and the allied *V. paniculata* and *longifolia* have long been cultivated for ornament in cottage gardens.

2. Rock Veronica. *Veronica saxatilis*, Linn. (Fig. 744.)
(Eng. Bot. t. 1027.)

A low, spreading perennial, glabrous in all its parts except a slight glandular down in the upper part, branching and often woody at the base, with spreading or ascending flowering branches, 3 or 4 inches long. Leaves small, obovate or oblong, entire or nearly so, and rather firm. Racemes short, consisting of a few, rather large, bright-blue flowers, on short pedicels. Capsules ovate.

On alpine rocks, often at great elevations, in most of the great mountain-chains of Europe, extending northwards to the Arctic Circle, but scarcely into Asia. In Britain, not very abundant, and only in the highlands of Perthshire and some adjoining counties of Scotland.

Fl. summer. A variety with smaller pink flowers has been distinguished under the name of *V. fruticulosa* (Eng. Bot. t. 1028), but it is very rare, and probably merely accidental.



Fig. 744.

3. Alpine Veronica. *Veronica alpina*, Linn. (Fig. 745.)
(Eng. Bot. t. 484.)

Stock shortly creeping, but never woody as in the *rock V.*, and much less branched than in the *thyme-leaved V.* Flowering branches often solitary, always simple, ascending, from 2 to 4 or even 5 inches high, and slightly hairy. The raceme, when young, forms a short, slightly hairy head, and even in fruit is but little elongated, consisting of 4 or 5 rather small blue flowers, varying occasionally, as in other species, to a pale pink or flesh-colour.

In alpine situations, in most of the great chains of Europe, Asia, and North America, extending into high northern



Fig. 745.

latitudes. In Britain, only near the summits of the higher mountains of Scotland, and not known in England or in Ireland. *Fl. summer.*

4. **Thyme-leaved Veronica.** *Veronica serpyllifolia*, Linn.
(Fig. 746.)

(Eng. Bot. t. 1075.)

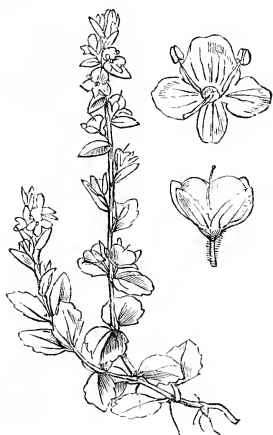


Fig. 746.

Stems shortly creeping, very much branched, forming a small, flat, dense, leafy tuft; the flowering branches ascending, 2 to 4 or 5 inches high. Leaves nearly sessile, ovate, seldom half an inch long, very slightly crenate, and usually glabrous as well as the rest of the plant. Flowers very small, of a pale-blue or white, with darker streaks, sessile or shortly stalked, in terminal spikes or racemes; but the bracts, especially the lower ones, are rather large and leaf-like, so as to give the inflorescence much the appearance of that of the annual *Veronicas*. Capsule broad, and often rather deeply notched.

In pastures, fields, and waste places, in Europe and Russian and central Asia, from the Mediterranean to the Arctic Circle, and ascending to high alpine summits. Abundant in Britain. *Fl. spring and summer.* A variety with slightly downy stems occurs occasionally in the Scotch mountains.

5. **Common Veronica.** *Veronica officinalis*, Linn.
(Fig. 747.)

(Eng. Bot. t. 765.)

Stems perennial at the base, much branched, creeping, and rooting at the nodes, extending sometimes to a foot or more, but usually about half that length. Leaves obovate or oblong, toothed, and hairy. Spikes or racemes like those of the preceding species, but hairy, and they are axillary, not terminal; for although sometimes, proceeding from the upper axils, they may appear terminal before the end of the branch has grown out, yet they are never really so. Flowers nearly

sessile, rather small, pale-blue or rarely flesh-coloured. Capsule obovate or obcordate, broader than it is long.

In woods, and rather dry bushy pastures, throughout Europe and Russian and central Asia, and now naturalized in North America. Extends over the whole of Britain. *Fl. the whole summer.*



Fig. 747.

6. Water Veronica. *Veronica Anagallis*, Linn. (Fig. 748.)
(Eng. Bot. t. 781.)

Rootstock shortly creeping, the stems erect and branching, from 6 inches to 2 feet high, often thick and succulent, glabrous as well as the whole plant. Leaves lanceolate, broad or narrow, sessile or clasping the stem at the base, more or less toothed. Racemes numerous, axillary, and opposite (in the axils of both leaves of each pair). Flowers rather small, pedicellate, pale-blue. Capsules ovate, less flattened than in some species, and slightly notched at the top.

In wet ditches, and along streams and ponds, widely spread over Europe, Russian and central Asia, and North America, but not an Arctic plant. Extends all over Britain, to the northern extremity of Scotland. *Fl. summer.*



Fig. 748.

7. Brooklime Veronica. *Veronica Beccabunga*, Linn.
(Fig. 749.)

(Eng. Bot. t. 655. *Brooklime.*)

Stems procumbent or floating at their base, rooting at the nodes; the



Fig. 749.

flowering branches ascending, thick and succulent, and, as well as the whole plant, quite glabrous. Leaves shortly stalked, ovate or oblong, obtuse, slightly toothed, and rather thick. Flowers small, blue or rarely pink, in opposite axillary racemes, often scarcely longer than the leaves. Capsule shorter than the calyx, broad and rather thick, and notched at the top.

In wet ditches, and along streams and ponds, in Europe, Russian and central Asia, and northern Africa, but scarcely extending to the Arctic regions. Common in Britain. *Fl. the whole summer.*

8. Marsh Veronica. *Veronica scutellata*, Linn.
(Fig. 750.)

(Eng. Bot. t. 782.)



Fig. 750.

Rootstock slender and perennial, emitting creeping runners; the stems slender, ascending or spreading, seldom above 6 inches high, glabrous or rarely downy. Leaves linear-lanceolate, glabrous, entire or scarcely toothed. Flowers few, in very slender racemes, proceeding alternately from one axil only of each pair of leaves. Pedicels filiform. Corolla rather small, of a pale pinkish-blue. Capsule very flat, broad, and rather deeply notched.

In marshes, ditches, and wet places, in northern and central Europe, Russian Asia, and north America. Extends almost all over Britain. *Fl. summer.*

9. **Mountain Veronica.** *Veronica montana*, Linn.
(Fig. 751.)

(Eng. Bot. t. 766.)

The foliage is nearly that of the *Germander V.*, but the stem is more trailing, rooting at the nodes, and hairy all round; the leaves are on longer stalks; the racemes are looser and more slender, with fewer flowers, which are usually rather small, and the capsule is very flat, about 4 lines broad, and only 3 long, regularly orbicular, the broadest part being in the middle, notched at the top, and often minutely toothed, and ciliate round the edge.

In moist woods, over the whole of temperate Europe, from southern Sweden to southern Russia, but not so frequent as the *common V.* and the *Germander V.* Not unfrequent in most parts of England and Ireland, as well as in several Scotch counties. *Fl. spring and summer.*



Fig. 751.

10. **Germander Veronica.** *Veronica Chamædrys*, Linn.
(Fig. 752.)

(Eng. Bot. t. 623.)

Stems weak, creeping at the base, then ascending, often above a foot long, and remarkable by the hairs collected into two opposite lines down the stem from between each pair of leaves to the leaf next below, whilst the rest of the stem is glabrous or nearly so. Leaves shortly stalked, ovate, cordate, crenate, and hairy. Racemes axillary, one only from each pair of leaves, much longer than the leaves, with rather large bright blue, or rarely smaller pinkish flowers, on rather long pedicels. Calyx 5-cleft. Capsule flat, very broad, and notched at the top, narrowing towards the base.



Fig. 752.

In woods, pastures, hedgebanks, roadsides, etc.; very common all over Europe and Russian Asia, from the Mediterranean to the Arctic Circle. Extends all over Britain. *Fl. spring and summer.*

11. Ivy Veronica. *Veronica hederæfolia*, Linn. (Fig. 753.)
(Eng. Bot. t. 784.)



Fig. 753.

An annual, usually not so hairy as the *procumbent V.*; the leaves of a thicker and smoother consistence, more distinctly stalked, broadly orbicular, with 5 or 7 coarse teeth or short lobes, the middle one broad and rounded; but the chief distinction is in the calyx, the divisions of which are broadly heart-shaped, not narrowed at the base. Corolla and capsule nearly those of the *procumbent V.*, but there are usually but 1 or 2 seeds in each cell.

In waste and cultivated places, in Europe and Russian Asia, extending as a weed of cultivation over nearly the same area as the *procumbent V.*, but generally less abundant. In Britain, not near so common as the *procumbent V.* *Fl. all summer.*

12. Procumbent Veronica. *Veronica agrestis*, Linn.
(Fig. 754.)

(Eng. Bot. t. 783 and Suppl. t. 2603.)



Fig. 754.

A more or less hairy, much branched annual, with procumbent or prostrate stems, from 3 inches to 8 or 10 inches long. Leaves shortly stalked, ovate and toothed; the lowest opposite, without flowers, but the greater number alternate, each with a pedicel in its axil, a usually shorter than the leaf, bearing single, small, blue or pinkish-white flower. Sepals ovate or oblong, usually longer than the corolla. Capsule composed of 2 ovoid, erect lobes, each containing a small number of seeds, which

are rough and convex on the outside, and hollowed out into a cup on the inner face.

In waste and cultivated places; a very common weed all over Europe and Russian Asia, and introduced into North America and other countries. Very abundant in Britain. *Fl. the whole season.* It varies in the shape of the sepals, and the size and colour of the corolla, and has been divided into three more or less marked varieties or races: — *V. agrestis*, with oblong sepals, and white or pink flowers; *V. polita*, with ovate sepals, and larger blue flowers; *V. opaca*, with spatulate sepals and fewer seeds; but none of these characters have sufficient constancy to justify their maintenance as distinct species.

13. Buxbaum's Veronica. *Veronica Buxbaumii*, Ten.

(Fig. 755.)

(Eng. Bot. Suppl. t. 2769.)

This closely resembles the *procumbent V.*, but is much larger in all its parts; the pedicels are longer, the flowers larger, of a bright blue, and the lobes of the capsule are broad and divaricate, so that the whole capsule when ripe is about 4 lines broad and only 2 long.

A weed of cultivation, like the other annual species, but much more abundant in southern Europe and central Asia than in central or northern Europe. Occurs rather frequently in England, southern Scotland, and southern Ireland, but probably introduced with Clover or other seeds. *Fl. all summer.*



Fig. 755.

14. Wall Veronica. *Veronica arvensis*, Linn. (Fig. 756.)

(Eng. Bot. t. 734.)

A little, hairy annual, seldom 6 inches high, and often much smaller; the stems sometimes erect and simple, sometimes diffuse and branching at the base. Leaves almost sessile, opposite, ovate, and toothed, but not cut; the upper floral ones small, alternate, lanceolate, and en-



Fig. 756.

ture. Flowers small and sessile, forming terminal, leafy racemes; the sepals oblong or lanceolate, unequal in size; the corolla very small, blue or nearly white. Capsule broad, much flattened, notched, each cell containing a small number of broad, flattened seeds.

In cultivated and waste places, banks, old walls, etc., throughout Europe and Russian Asia. Abundant in Britain. *Fl. the whole season.*

15. Vernal Veronica. *Veronica verna*, Linn. (Fig. 757.)

(Eng. Bot. t. 25.)



Fig. 757.

A small, erect annual, seldom above 2 or 3 inches high, closely allied to the *wall V.*, of which it has the almost sessile flowers; but the stem-leaves are deeply cut into three, five, or seven narrow lobes as in the *fingered V.*

A more southern species than the *wall V.*, widely spread over central and southern Europe, and south Russian Asia to the Altai, but rare in the north. In Britain, it has been found in a few localities in Norfolk and Suffolk. *Fl. spring and summer.*

16. **Fingered Veronica.** *Veronica triphyllos*, Linn.
(Fig. 758.)

(Eng. Bot. t. 26.)

Stem spreading, or almost trailing, as in the *procumbent V.* and the *Ivy V.*; but the leaves are deeply cut into three, five or seven digitate lobes, and the capsule and seeds are more like those of the *wall V.* Flower-stalks rather longer than the floral leaves, which are much smaller and less divided than the stem-leaves. Corolla small, of a deep blue. Capsule broad, with several thin but concave seeds.

In cultivated and waste places, widely spread over central and southern Europe and western Asia, extending northward into southern Sweden. Rare in Britain, having been only found in a few localities in Suffolk, Norfolk, and Yorkshire. *Fl. spring and summer.*



Fig. 758.

X. **BARTSIA.** BARTSIA.

Herbs, usually half-parasitical on the roots of other plants, with erect stems, opposite leaves, and yellow or purple flowers in terminal spikes. Calyx tubular or campanulate, 4-cleft. Corolla with a distinct tube; the limb 2-lipped; the upper lip erect, concave, entire or notched, but without spreading lobes. Stamens 4, in pairs; the cells of the anthers pointed at the base. Capsule opening in 2 valves in the middle of the cells. Seeds many, more or less striated or furrowed.

Rather a large genus, chiefly European, north African, and west Asiatic, but also with a considerable number of South American species. It has been divided into three or four distinct genera, distinguished chiefly by the seeds; but although I had myself on another occasion adopted three of them, it appears to me now to be a more natural and convenient course to consider them as sections of one genus, distinguished from *Eyebright* by the form of the corolla.

Spikes paniced. Flowers pink. Seeds few, pendulous . . . 3. *Red B.*

Spikes simple or nearly so. Seeds numerous.

Spikes short. Flowers dull-purple. Calyx campanulate. Seeds deeply furrowed . . . 1. *Alpine B.*

Spikes long. Flowers yellow. Calyx tubular. Seeds scarcely striated . . . 2. *Viscid B.*

1. **Alpine Bartsia.** *Bartsia alpina*, Linn. (Fig. 759.)

(Eng. Bot. t. 361.)



Fig. 759.

A hairy perennial, with a short root-stock, and erect stem 6 to 8 inches high. Leaves sessile, ovate and crenate, the floral ones rather smaller. Flowers in a short, leafy spike. Calyx deeply 4-lobed. Corolla of a dull livid-purple, 8 or 9 lines long, with a tube much longer than the calyx, and very short lobes to the lower lip. Anthers very hairy. Capsule ovate, longer than the calyx, with several deeply furrowed, almost winged seeds.

In mountain pastures, in the higher chains of central and northern Europe, to the Arctic regions. Rare in the higher mountains of Scotland and the north of England, and unknown in Ireland. *Fl. summer.*

2. **Viscid Bartsia.** *Bartsia viscosa*, Linn. (Fig. 760.)

(Eng. Bot. t. 1045.)



Fig. 760.

An erect, rigid annual, often above a foot high, more or less clothed with a short, glutinous down; the root-fibres hard and wiry. Leaves lanceolate, coarsely toothed, the floral ones alternate. Flowers yellow, in a long terminal spike; the calyx tubular, 6 lines long, with 4 lanceolate lobes; the corolla half as long again, with the lower lip longer than the upper one. Anthers hairy. Capsule oblong, with very numerous, minute, scarcely striated seeds.

In fields and pastures, chiefly near the sea, in western Europe, and round the whole Mediterranean region, and has established itself in the Canary Islands and South America. In Britain, at present confined to some of the

southern and the western maritime counties of England, to southern Ireland, and south-western Scotland. *Fl. summer and autumn.*

3. Red Bartsia. *Bartsia Odontites*, Huds. (Fig. 761.)

(Eng. Bot. t. 1415.)

An erect, branching annual, seldom a foot high, slightly downy, and not glutinous. Leaves lanceolate and toothed. Flowers of a purplish-red, numerous, in one-sided spikes; the calyx campanulate, 4-cleft; the upper lip of the corolla longer than the lower one. Anthers scarcely hairy. Capsule oblong, with a few pendulous, furrowed seeds, as in *Eyebright*, but with the general habit and corolla of a *Bartsia*.

In fields and waste places, all over Europe and Russian Asia, except the extreme north. Generally distributed over Britain. *Fl. summer.*



Fig. 761.

XI. **EYEBRIGHT.** EUPHRASIA.

Erect annuals, or, in some exotic species, perennials, closely allied to *Bartsia*, and differing chiefly in the corolla, which has the upper lip much less concave, with 2 lobes spreading laterally or turned back, and the lobes of the lower lip are more spreading, and usually notched. Seeds few, pendulous, and furrowed.

There is probably but one species of the genus in the northern hemisphere, but several others are natives of Australia and South America.

1. Common Eyebright. *Euphrasia officinalis*, Linn.

(Fig. 762.)

(Eng. Bot. t. 1416.)

A little, much branched annual, varying wonderfully in size, station, shape of the leaves, size and colour of the flowers, etc., and believed

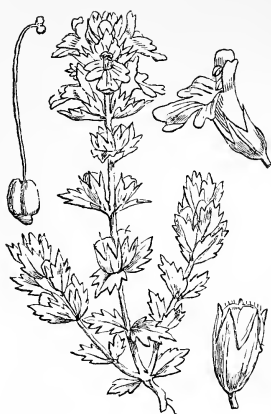


Fig. 762.

to be half-parasiticon the roots of grasses. It is most frequently from 2 to 6 inches high, glabrous or slightly downy. Leaves small, sessile, opposite, ovate, deeply toothed, the teeth of the lower ones obtuse, of the upper ones finely pointed. Flowers in loose, terminal, leafy spikes; the calyx with 4 or 5 pointed teeth; the corolla white or reddish, streaked with purple, and a yellow spot in the throat, the tube usually shorter than the spreading lobes. Capsule oblong. Sometimes, especially in high alpine regions, the whole plant is but 1 inch high, with minute, almost yellow flowers; when luxuriant it will attain 8 inches, with flowers near half an inch long. The leaves in some varieties are all broad, obtuse, al-

most orbicular, and the upper ones closely imbricated; in others they are all narrow, very pointed, and distant.

In pastures, throughout Europe and Russian and central Asia, from the Mediterranean to the Arctic regions and the highest alpine summits. Abundant in Britain. *Fl. summer and autumn*. The numerous varieties are referred, by those who have studied them most, to two principal races,—the *common E.*, with a more glandular down, especially on the calyx, the teeth of the leaves obtuse, or the upper ones shortly pointed, the capsule broadly oblong, and the seeds ovoid; and the *wood E.* (*E. nemorosa*), which is never glandular, the teeth of the upper leaves at least ending in a fine point, the capsule very narrow, and the seeds spindle-shaped; but many forms occur in which these characters are differently combined, or pass gradually into each other.

XII. **RATTLE.** RHINANTHUS.

A genus limited to the single species described below, distinguished from *Pedicularis* chiefly by the calyx and capsule.

1. **Common Rattle.** *Rhinanthus Crista-galli*, Linn. (Fig. 763.)

(Eng. Bot. t. 657.)

An erect, glabrous or slightly hairy annual, with a shortly branched, fibrous root, which attaches itself to the living roots of grasses and

other plants by means of slightly enlarged suckers. Stem from a few inches to a foot high, simple or slightly branched. Leaves opposite, lanceolate, and more or less coarsely toothed; the floral ones broader, shorter, and more cut at the base. Flowers in a loose, leafy spike; the calyx nearly orbicular, inflated, but compressed, contracted at the mouth, with 4 small teeth. Corolla yellow, often with a purple spot on the upper, or upon both lips; the tube longer than the calyx; the upper lip laterally compressed, with a tooth or lobe on each side in front; the lower lip shorter, with 3 spreading lobes. Stamens 4, in pairs, with obtuse, hairy anther-cells. Capsule orbicular, flattened, with a few large, flat, usually winged seeds.

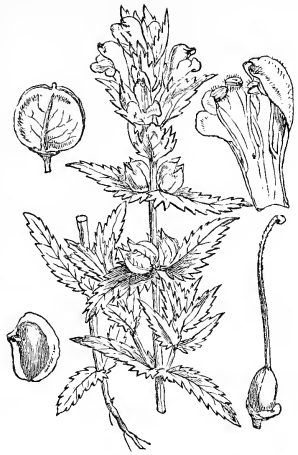


Fig. 763.

In meadows and pastures, in Europe and Russian Asia, from the Mediterranean to the Arctic regions. Abundant in Britain, often causing much injury to the herbage. *Fl. summer, or sometimes later.* It varies much in stature, in the breadth of the leaves, in the size of the flower, and in the form of the teeth of the upper lip; and botanists have distinguished three supposed species,—the *larger R.* (*R. major*, Eng. Bot. Suppl. t. 2737), with large flowers; the *lesser R.*, with small flowers; and the *narrow R.*, with linear leaves; but further observation has shown that these forms are neither constant, nor marked enough to be separated even as permanent races.

XIII. **PEDICULARIS.** PEDICULARIS.

Herbs, with leaves alternate, or in very few species whorled or nearly opposite, and pinnately lobed, toothed, or divided; and, in the British species, purple flowers, in leafy spikes or racemes. Calyx broadly tubular, inflated after flowering, with 2 to 5 irregular, often jagged teeth or lobes. Corolla with a distinct tube; the upper lip laterally compressed, entire or with a small tooth in front on each side. Stamens 4, in pairs, the anther cells not pointed. Capsule flattened, more or less oblique at the top, with a few large seeds attached to the lower part.

A numerous genus in the mountains of colder regions of the northern hemisphere, extending far into the Arctic Circle, and found also in some of the tropical mountain-ranges. It is always readily known by the foliage and calyx.

Stems 1 to 2 feet high. Calyx with 2 short, broad, jagged lobes.

Upper lip of the corolla with a tooth on each side, at or below the middle 1. *Marsh P.*

Stems prostrate or spreading, not 6 inches long. Calyx 4- or 5-toothed. Upper lip of the corolla without any teeth at or below the middle 2. *Common P.*

1. Marsh Pedicularis. *Pedicularis palustris*, Linn.

(Fig. 764.)

(Eng. Bot. t. 399. *Red Rattle*.)

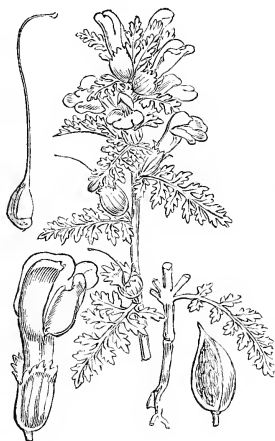


Fig. 764.

A nearly glabrous annual, with a rather thick root; the stems erect, or, in dry situations, decumbent at the base, much branched, about a foot high, or in water as much as 2 feet. Leaves often opposite, pinnate, with short, ovate, crenate or deeply cut segments; the floral ones alternate, and often twice pinnate. Flowers almost sessile in the axils of the upper leaves, of a deep purple-red. Calyx broad, with 2 broad, short, irregularly cut or jagged lobes. Upper lip of the corolla with 2 minute teeth on its inner edge just below the point, and 2 others below its middle. Capsule oblique, the short point projecting beyond the calyx.

In marshes, wet meadows, and watery ditches, in northern and central Europe, and Russian Asia, from the Altai to the Arctic regions. Generally spread over Britain, but not so common as the following species. *Fl. all summer.*

2. Common Pedicularis. *Pedicularis sylvatica*, Linn.

(Fig. 765.)

(Eng. Bot. t. 400. *Lousewort*.)

Rootstock perennial, with prostrate or spreading, branching stems,

seldom above 6 inches long. Leaves alternate, pinnate, with deeply cut, small segments. Flowers sessile in the upper axils, pink-red or rarely white. Calyx broadly oblong, with 5 unequal teeth or short lobes, the longer ones often toothed. Tube of the corolla much longer than the calyx, the upper lip with one minute tooth on each side, under the point.

In moist pastures, and meadows, all over western, central, and northern Europe, but disappearing in the south and the east. Common in Britain. *Fl. spring and summer.*



Fig. 765.

XIV. **MELAMPYRE** MELAMPYRUM.

Erect or spreading herbs, probably semi-parasitical like the *Rattle*, with opposite leaves and branches; the floral leaves often passing into coloured bracts; the flowers yellow, purple or variegated, either axillary or in terminal leafy spikes. Calyx tubular or campanulate, with 4 teeth. Corolla with a distinct tube; the upper lip compressed, entire or with a small tooth or lobe on each side in front; the lower lip spreading, with 3 short lobes, and a more or less projecting palate closing the mouth of the tube or nearly so. Capsule ovate, oblique, with from 1 to 4 oblong seeds.

A small but distinct genus, confined to Europe and northern Asia.

Flowers variegated with purple, in short leafy spikes.

Spikes closely imbricated, 4-sided. Floral leaves broadly cordate and finely toothed 1. *Crested M.*

Spikes oblong, rather loose. Floral leaves ovate, acuminate, with long slender teeth 2. *Purple M.*

Flowers yellow, in distant axillary pairs, all turned one way.

Upper floral leaves toothed at the base. Flowers pale yellow, 6 lines long or more 3. *Common M.*

Floral leaves all entire. Flowers deep yellow, 3 or 4 lines long 4. *Small-flowered M.*

1. **Crested Melampyre.** *Melampyrum cristatum*, Linn.
(Fig. 766.)

(Eng. Bot. t. 41.)



Fig. 766.

Stem simple, or with a few broadly-spreading opposite branches, 8 inches to a foot high. Leaves lanceolate or linear and entire, or the upper ones toothed at the base. Flowers in a densely imbricated 4-sided spike, 1 to $1\frac{1}{2}$ inches long; the floral leaves or bracts under each flower short and broad, finely but shortly toothed, and of a clear pink or purplish colour at the base. Corolla yellow, more or less variegated with purple, about 6 lines long.

In woods and thickets, over nearly the whole of Europe and Russian Asia, but not so common as some other species. In Britain, chiefly confined to eastern England. *Fl. summer.*

2. **Purple Melampyre.** *Melampyrum arvense*, Linn.
(Fig. 767.)

(Eng. Bot. t. 53. *Cowwheat.*)

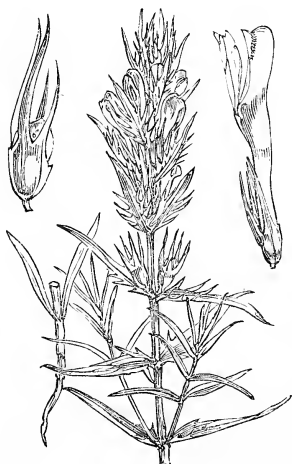


Fig. 767.

A taller and handsomer plant than the *crested M.*, and usually covered with a very short close down. Leaves lanceolate, toothed at the base. Flowers in a long, loose, leafy spike, beautifully variegated; the bracts often longer than the flowers, at first pink, turning green as they advance, and bordered by long slender teeth. Calyx purplish-green, with similar long teeth. Corolla 6 to 8 lines long, with a pink tube, a bright yellow throat, and deep-red lips.

In cornfields, in temperate Europe, from south Sweden to the Caucasus, often proving very injurious to the crops. In Britain, hitherto confined to a few localities in southern England and in Norfolk. *Fl. summer.*

3. Common Melampyre. *Melampyrum sylvaticum*, Linn.

(Fig. 768.)

(Eng. Bot. t. 113.)

Stem erect or ascending, 6 inches to a foot high, with very spreading opposite branches, usually glabrous or nearly so. Leaves lanceolate, the floral ones distant from each other, short, and often toothed at the base. Flowers pure yellow, in distant axillary pairs, all turned one way, and about 6 to 8 lines long; the teeth of the calyx usually erect and shorter than the tube, but they vary much both in length and direction.

Chiefly in woods, throughout Europe and Russian Asia. Abundant in Britain. *Fl. summer and autumn.*



Fig. 768.

4. Small-flowered Melampyre. *Melampyrum sylvaticum*,

(Fig. 769.)

(Eng. Bot. t. 804.)

Very near the *common M.*, and not always easy to distinguish from it. It is usually a smaller plant, with the floral leaves almost always entire, and the flowers very much smaller, of a deep yellow; the calycine teeth are more conspicuous, and the lower ones spreading. Corolla seldom above four lines long.

A high northern and alpine plant, not unfrequent in the woods of northern Europe and Asia, and in the high mountain-ranges of central Europe, the Caucasus, and Altai. In Britain, apparently limited to the Scotch Highlands and some parts of northern England, and north Ireland. *Fl. summer.*



Fig. 769.

LV. THE LABIATE FAMILY. LABIATÆ.

Herbs, or rarely shrubs, with quadrangular stems or branches, and leaves always opposite. Flowers in the axils of the upper leaves or bracts, rarely solitary in each axil, more frequently in cymes, often so closely clustered that the two opposite cymes appear like one whorl (sometimes more correctly called a *verticillaster* or false whorl) of 6, 10, or more flowers, the whole forming usually a terminal compound spike, raceme, or panicle (more strictly termed a *thyrsus*). Besides the pair of floral leaves or bracts under the whorls, there are often smaller bracts to each flower in the whorl. Calyx 5-toothed, or rarely 2- or 3-lobed. Corolla with a distinct tube and a more or less irregular 4- or 5-lobed limb, usually forming two lips. Stamens 2 or 4, in 2 pairs. Ovary 4-lobed, with one erect ovule in each lobe, and a single style rising from the centre, and shortly cleft to the top into 2 stigmatic lobes. Fruit enclosed in the persistent calyx, separating into 4 small one-seeded and seed-like nuts.

A vast family, spread over every quarter of the globe, and readily known from all *Monopetals*, except the *Borage* family, by the 4-lobed ovary and the 4 small nuts resembling naked seeds in the bottom of the calyx; and from *Boraginæ* the *Labiates* are distinguished by their opposite leaves, the want of the fifth stamen, and usually by the more irregular flowers. Most of the species have also a peculiar strong scent, either highly aromatic in many of our culinary potherbs, or as disagreeable in several species of *Stachys*. Distinct however as the whole family is, the genera into which it has been divided are much less so than could be wished. Those especially which are allied to *Stachys* are separated from it by slight differences in the shape of the calyx and corolla, which are not always easy to appreciate.

- | | | | |
|---|---|---|---------------|
| 1 | { | Stamens, at least the longer ones, longer than the upper lip of the corolla | 12 |
| | { | Stamens in pairs, or 2 only, under the upper lip of the corolla | 2 |
| | { | Stamens concealed within the tube of the corolla | 16 |
| 2 | { | Calyx regularly 5-toothed. Stamens always 4 | 3 |
| | { | Calyx distinctly 2-lipped, the upper teeth more or less united into an upper lip, the 2 lower ones united or distinct. Stamens 4 or 2 . . . | 9 |
| 3 | { | Calyx with 15 parallel ribs. Outer stamens the shortest | 7. NEPETA. |
| | { | Calyx with 5 or 10 principal ribs or veins. Outer stamens the longest . . | 4 |
| 4 | { | Lower leaves deeply divided. Upper lip of the corolla very hairy, almost woolly | 15. LEONURUS. |
| | { | Lower leaves coarsely toothed. Upper lip of the corolla glabrous or hairy . | 5 |

- 5 { Anthers opening by transverse valves, one valve fringed with small hairs. 13. GALEOPSIS.
 { Anthers opening by longitudinal valves 6
- 6 { Flowers bright yellow Yellow LAMTUM.
 { Flowers purple, pink, or white 7
- 7 { Nuts flat and angular at the top. Lateral lobes of the lower lip of the corolla either very small and tooth-like or pointed. Anthers hairy. 16. LAMTUM.
 { Nuts rounded at the top. Lateral lobes of the lower lip usually obtuse. Anthers glabrous 8
- 8 { Calyx funnel-shaped, the teeth ovate, spreading, with a fine point. 14. BALLOTA.
 { Calyx tubular or campanulate, with narrow-pointed teeth 12. STACHYS.
 { Calyx of 2 entire lobes, the upper one with a concave scale on the back. 9. SKULLCAP.
- 9 { Calyx with the upper lip more or less toothed or lobed, the lower one 2-cleft to the base 10
- 10 { Stamens 2 (the filaments branched, one branch with a perfect anther-cell, the other with an imperfect one) 1. SAGE.
 { Stamens 4, each with a 2-celled anther 11
- 11 { Calyx broadly campanulate, veined, with 4 or 5 obtuse lobes or teeth. 10. MELITTIS.
 { Calyx upper-lip flat and angular, with 3 small teeth. Filaments with a small tooth below the anther 8. PRUNELLA.
 { Calyx upper-lip 3-toothed, the tube 13-nerved, hairy inside at the top. 6. CALAMINT.
- 12 { Lobes of the corolla nearly equal 13
 { Upper lobes of the corolla very short and tooth-like, lower ones elongated so as to make the corolla appear 1-lipped 17
- 13 { Stamens 2 2. LYCOPUS.
 { Stamens 4 14
- 14 { Corolla nearly regular, 4-lobed. Calyx equally 5-toothed, scarcely hairy in the throat 3. MINT.
 { Upper lip of the corolla erect. Calyx very hairy in the throat . . . 15
 { Low, procumbent plant, with small leaves. Calyx distinctly 2-lipped. 4. THYME.
- 15 { Erect plant. Flowers in heads, intermixed with bracts in a terminal panicle. Calyx nearly equally 5-toothed 5. MARJORAM.
- 16 { Calyx with 10 recurved teeth. Stamens all perfect . . 11. HOREHOUND.
 { Calyx with 5 teeth. Stamens mostly barren 14
- 17 { Short upper lip of the corolla deeply cleft into 2 teeth, between which the stamens protrude 17. GERMANDER.
 { Short tooth-like upper lip entire or notched, behind the stamens. 18. BUGLE.

The genera of *Labiates* have been distributed into eight Tribes, of which the five following are represented in Britain:—

1. MONARDEÆ. Two ascending stamens, in which one cell of each anther is either wanting or separated from the other. *Genus*,—1. SAGE.

2. SATUREINÆ. Two or four spreading or ascending stamens. Upper lip of the corolla with the lobes usually flat. *Genera*:—2. LYCOPUS: 3. MINT; 4. THYME; 5. MARJORAM; and 6. CALAMINT.

3. NEPETEÆ. Four ascending stamens, of which the upper or middle pair are the longest (project above the others), whilst in the preceding and two following tribes the lower or outer pair are the longest. *Genus*,—7. NEPETA.

4. STACHYDEÆ. Four ascending stamens. Upper lip of the corolla usually concave or arched. *Genera*:—8. PRUNELLA; 9. SKULLCAP; 10. MELITTIS; 11. HOREHOUND; 12. STACHYS; 13. GALEOPSIS; 14. BALLOTA; 15. LEONURUS, and 16. LAMIUM.

5. AJUGOIDEÆ. Stamens ascending (4 in the British genera). Corolla apparently 1-lipped. *Genera*:—17. GERMANDER, and 18. BUGLE.

Among *Labiata* genera entirely exotic, the *sweet Basil* (*Ocimum*), *Lavender* (*Lavandula*), *Rosemary* (*Rosmarinus*), *Balm* (*Melissa*), *Savory* (*Satureia*), and *Hyssop* (*Hyssopus*) are cultivated among our culinary potherbs; several species of *Coleus*, including the *Patchouly*, in our hothouses; the shrubby *Phlomis* and *Leonotis*, and the herbaceous *Perilla*, *Monardas* and *Dracocephalums*, and occasionally a few others, in our flower-gardens.

I. SAGE. SALVIA.

Herbs, or, in some exotic species, shrubs, with the flowers usually in whorls of 6 or more, forming terminal racemes or spikes, the floral leaves all or most of them reduced to mere bracts. Calyx 2-lipped, the upper lip entire or with 3 small teeth, the lower one 2-cleft. Corolla with the upper lip erect, concave, or arched; the lower spreading, 3-lobed; the middle lobe often notched or divided. Stamens really 2, although easily mistaken for 4, for the anthers have a long slender connectivum, having the appearance of a filament, fastened by the centre to the very short real filaments, and bearing at one end a perfect anther-cell under the upper lip of the corolla, and at the other end a small cell, almost always empty, and usually much deformed.

A very large genus, widely spread over the temperate and warmer regions of the globe, although within the tropics the majority of species are mountain plants. The structure of the stamens readily distinguishes them from all other *Labiates*.

Leaves mostly radical. Corolla large, near thrice as long as the

calyx 1. *Meadow S.*
Stem leafy. Corolla small, not twice the length of the calyx . 2. *Wild S.*

Many exotic species are cultivated in our gardens, the *common* or

garden Sage (*S. officinalis*) from southern Europe as a potherb, and several American ones for the beauty of their flowers.

1. **Meadow Sage.** *Salvia pratensis*, Linn. (Fig. 770.)

(Eng. Bot. t. 153.)

Stock perennial, with a spreading tuft of shortly stalked radical leaves, ovate, heart-shaped, or oblong, 2 to 6 inches long, coarsely toothed, and very much wrinkled. Stem 1 to 1½ feet high, slightly downy, with only a few narrow leaves near its base. Flowers in a long and handsome, terminal, simple or scarcely branched spike, composed of whorls of about 6 flowers, at regular distances. Upper lip of the calyx minutely 3-toothed. Corolla near thrice as long, of a rich blue, with a long, arched upper lip.



Fig. 770.

In dry pastures, roadsides, and waste places, in central and southern Europe to the Caucasus, extending northwards into Sweden and to the French side of the English Channel. Rare in England, and hitherto almost confined to the neighbourhood of Cobham, in Kent. *Fl. summer*.

2. **Wild Sage.** *Salvia verbenaca*, Linn. (Fig. 771.)

(Eng. Bot. t. 154.)

A coarse, more or less hairy, erect perennial, 1 to 1½ or rarely 2 feet high, and slightly branched. Lower leaves stalked, ovate, coarsely toothed or lobed, and much wrinkled; the upper ones sessile, broader and shorter; the bract-like floral leaves small, heart-shaped, and entire. Flowers small, blue, in whorls of about 6, forming terminal hairy spikes; the corolla seldom twice the length of the calyx.

In waste places, on roadsides, etc., in northern and central Europe and Russian Asia. Scattered over England, Ireland, and southern



Fig. 771.

Scotland as far as Edinburgh. *Fl. summer.* In southern Europe it is replaced by the small-flowered *S. clandestina*, a marked variety or perhaps species, on a smaller scale, with narrower, more cut leaves, and smaller flowers, which has been indicated in some parts of south-western England and in the Channel Islands, but all the British specimens I have seen are nearer to the common *wild S.*

II. **LYCOPUS.** LYCOPUS.

Herbs, with the habit and flowers of a *Mint*, but with only 2 stamens, and the nuts surrounded by a thickened, somewhat corky border.

Besides the British species there are but very few, dispersed over Europe, Asia, and America. Perhaps indeed all but one may be mere varieties of the common one.

1. **Common Lycopus.** *Lycopus europæus*, Linn. (Fig. 772.) (Eng. Bot. t. 1105. *Gipsywort*.)

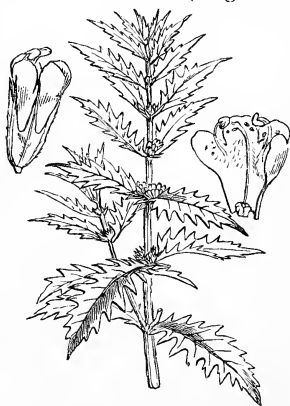


Fig. 772.

A tall, erect, and branching perennial, slightly hairy, with a shortly creeping rootstock. Leaves shortly stalked, lanceolate or almost ovate, deeply toothed or pinnatifid. Flowers small and very numerous, in dense axillary whorls or clusters, seldom exceeding the leafstalk. Calyx-teeth 5, stiff and pointed. Corolla scarcely exceeding the calyx-teeth, and nearly equally 4-lobed. Stamens rather longer.

In wet ditches, and marshes, throughout Europe, Russian and central Asia, and north America, and perhaps the same species in Australia. Abundant in England and Ireland, extending into Scotland, but becoming rare as it advances northward. *Fl. summer.*

III. **MINT.** MENTHA.

Perennial herbs, usually downy or hairy, with rather small flowers in dense whorls or clusters, which are either collected in terminal heads or spikes, or axillary and distant. Calyx of 5 teeth, regular or slightly 2-lipped. Corolla with a short tube and a campanulate 4-lobed limb, the upper lobe rather broader and sometimes slightly notched. Stamens 4, equal and erect, the anthers 2-celled. Nuts smooth, not bordered.

A natural genus, not numerous in species, but widely diffused over the greater part of the globe without the tropics, and most of the species, from the variety of situation to which they will adapt themselves, vary so much as to render their exact definition almost hopeless. Many of them also propagate so readily from suckers, that individual varieties are perpetuated so as to assume the appearance of species. Almost all the species vary in the stamens, in some individuals much longer than in the corolla, in others included within the tube, and often barren; and in several species individuals occur with all the leaves crisped and cut, and have been published as distinct, under the names of *M. crispa* or *crispata*.

Whorls of flowers in terminal spikes or heads.

Leaves mostly sessile. Flowers in spikes.

Leaves and stem downy or hairy.

Leaves narrow-ovate or lanceolate 1. *Horse M.*

Leaves broadly ovate or orbicular 2. *Round-leaved M.*

Leaves and stem glabrous 3. *Spear M.*

Leaves all shortly stalked.

Flowers in cylindrical or elongated spikes . . . 4. *Pepper M.*

Flowers in terminal, globular or ovoid heads (rarely with a few dense clusters below the terminal one) 5. *Water M.*

Whorls of flowers all axillary, the last (terminal) pair of leaves having no flowers or only a very small whorl.

Flowering stems ascending or erect. Leaves coarsely crenate. Throat of the calyx not closed with hairs.

Calyx tubular, with narrow teeth 6. *Whorled M.*

Calyx campanulate, with short teeth 7. *Corn M.*

Flowering stems prostrate. Leaves small. Throat

of the calyx closed with hairs 8. *Pennyroyal M.*

1. **Horse Mint.** *Mentha sylvestris*, Linn. (Fig. 773.)

(Eng. Bot. t. 686.)

Rootstock, as in most *Mints*, more or less creeping, the stems 1 to



Fig. 773.

2 feet high, erect, slightly branched, and, as well as the whole plant, more or less hoary with a short close down. Leaves closely sessile, broadly lanceolate or narrow-ovate. Flowers small and numerous, in dense cylindrical spikes, 1 to 2 inches long, usually several together, forming an oblong terminal panicle.

In wet pastures, and waste places, along ditches, etc., in temperate and southern Europe and Russian and central Asia, but does not extend far north. In Britain, it appears to be confined to England and Ireland, and rare in the northern counties, the few Scotch localities indicated belonging more probably to the following. *Fl. summer, rather late.*

2. Round-leaved Mint. *Mentha rotundifolia*, Linn.

(Fig. 774.)

(Eng. Bot. t. 446.)



Fig. 774.

An erect perennial, like the *horse M.*, but coarser, greener, and more hairy. Leaves broadly ovate or orbicular, much wrinkled, green above and whitish underneath. Spikes of flowers terminal and cylindrical, more slender than in the last, 1 to 2 inches or rather more in length, forming a leafy, somewhat spreading panicle. Flowers small, pale pink or sometimes white.

Nearly as widely diffused over Europe and temperate Asia as the last, but rather more of a western plant. It spreads also more readily as an accompaniment of cultivation. In Britain, rather more common than the *horse M.*, extending into Scotland and Ireland, but probably in many cases introduced.

Fl. summer, rather late. Specimens occur occasionally so nearly intermediate between the two species that it is difficult to say to which they belong unless seen growing in masses.

3. Spear Mint. *Mentha viridis*, Linn. (Fig. 775.)

(Eng. Bot. t. 2424.)

An erect or ascending perennial, with the narrow leaves sessile or nearly so, and the cylindrical terminal spikes of the *horse M.*, but the stem and leaves are green and glabrous, although there are often hairs on the calyx and bracts.

Chiefly known in Europe, Asia, and North America, as the common *Mint* of gardens, and only found apparently wild in countries where it has been long cultivated. Occurs occasionally in Britain under similar circumstances. *Fl.* end of summer. It is not improbably a mere variety of the *horse M.*, of garden or accidental origin, rendered perpetual by its ready propagation by suckers.



Fig. 775.

4. Pepper Mint. *Mentha piperita*, Sin. (Fig. 776.)

(Eng. Bot. t. 687.)

A perennial, less erect than the *spear M.*, glabrous like that species or nearly so. Leaves more stalked and broader. Spikes fuller, consisting of larger whorls; the lower ones often distant, showing an approach to the character of the *water M.*

The common pungent variety appears to be of garden origin, occasionally spreading in wet places in several parts of Europe. Indicated in several localities in England and Ireland. *Fl.* end of summer. It may possibly prove to be a mere variety of the *water M.*



Fig. 776.

5. Water Mint. *Mentha aquatica*, Linn. (Fig. 777.)

(*M. hirsuta*, Eng. Bot. t. 447, and *M. odorata*, t. 1025.)



Fig. 777.

Usually a rather coarse perennial, 1 to $1\frac{1}{2}$ feet high, much branched, and almost always softly hairy, although some varieties become nearly glabrous. Leaves stalked, ovate or slightly heart-shaped. Flowers larger than in the *horse M.* and the *round-leaved M.*, in dense, terminal, globular or oblong heads, of more than half an inch in diameter, with occasionally 1, 2, or more additional whorls in the axils of the upper leaves. Calyx tubular, about $1\frac{1}{2}$ lines long, with fine pointed teeth.

In wet ditches, and marshes, and on the edges of streams, throughout Europe and Russian Asia, and now naturalized in many other countries. Abundant in Britain generally, but, like the two following, becomes rarer in the north of Scotland. *Fl. summer and autumn.*

6. Whorled Mint. *Mentha sativa*, Linn. (Fig. 778.)

(Eng. Bot. t. 448, and *M. acutifolia*, t. 2415.)

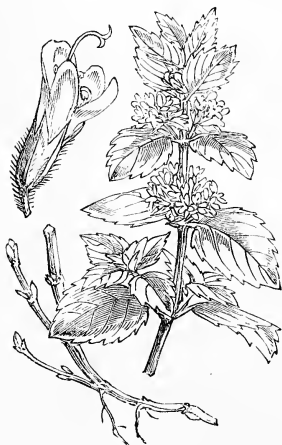


Fig. 778.

Intermediate, as it were, between the *water M.*, and the *corn M.*, this plant has the foliage and calyx of the former, but the stem is less erect and often low and spreading, as in the *corn M.*, and the flowers, as in the latter species, are all in distinct axillary whorls, without any terminal head or spike, or with only a very few flowers in the axils of the last pair of floral leaves. Its chief difference from the *corn M.* is in the more tubular, longer calyx, and larger flowers; but immediate forms are so numerous, connecting it on the one hand with the *corn M.* and on the other with the *water M.*, that many botanists have considered it as a mere variety of the one or of the other. These points cannot be determined with-

out a long course of experiments and observations made on a succession of seedlings, which are as rare in this as in other species of the genus.

As widely spread as the *corn M.*, all over temperate and northern Europe, and Russian Asia, but growing usually in moister situations and richer soils. Common in Britain. *Fl. summer and autumn.*

7. Corn Mint. *Mentha arvensis*, Linn. (Fig. 779.)

(Eng. Bot. t. 2119, *M. agrestis*, t. 2120, and *M. gentilis*, t. 449 and 2118.)

Usually a low, spreading, branched perennial, more or less hairy, with a creeping rootstock, and annual stems, from 6 inches to a foot long, rarely rising erect to the height of 1 or 2 feet. Leaves stalked, ovate, and toothed, 1 to 2 inches long, or the upper ones smaller. Flowers all in axillary whorls, mostly shorter than the leafstalks; the last pair of leaves without any or with only very few flowers. Calyx campanulate, seldom above a line long, with short teeth. Corolla twice as long.

In fields and moist places, in temperate and northern Europe and Russian Asia: rarer to the southward, but introduced with cultivation into many other parts of the globe. Abundant in Britain, although less so than the *water M.*, and, like that species, becomes rarer towards the north of Scotland. *Fl. summer and autumn.* It varies much in stature, in hairiness, in the size of the leaves, etc.



Fig. 779.

8. Pennyroyal Mint. *Mentha Pulegium*, Linn. (Fig. 780.)

(Eng. Bot. t. 1026. *Pennyroyal*.)

A prostrate, much branched perennial, with the leaves very much smaller than in any other *Mint*, being seldom above half an inch long, and quite entire or seldom slightly crenate; the floral ones still smaller, and often recurved. Flowers in dense axillary whorls, like those of the *corn M.*, except that the calyx-teeth are less regular, with the mouth closed by hairs, and the upper lobe of the corolla is more



Fig. 780.

evidently notched, thus showing a slight approach to the characters of *Thyme*.

In wet ditches, and marshy places, most abundant in the Mediterranean region, but extending over Europe and western Asia, and introduced into other parts of the world. Scattered over the greater part of England and southern Ireland, but appears to have been falsely indicated in Scotland. *Fl. end of summer.*

IV. **THYME.** THYMUS.

Low, much branched, spreading or procumbent undershrubs or herbs, with small leaves, usually entire, the flowers in terminal leafy heads or loose spikes. Calyx 2-lipped; the upper lip 3-toothed, the lower 2-cleft, the mouth closed with hairs after flowering. Corolla with the upper lip erect, nearly flat; the lower spreading, broadly 3-lobed. Stamens (when perfect) 4, the lower ones diverging, as long as or longer than the corolla.

The genus comprises several species, chiefly from the Mediterranean region and central Asia, where they are very variable and often difficult to determine. In northern Europe, however, there is but one species wild. The *garden Thyme*, so much cultivated as a potherb, is the *T. vulgaris*, from southern Europe.

1. **Wild Thyme.** *Thymus Serpyllum*, Linn. (Fig. 781.)

(Eng. Bot. t. 1514. *T. Chamædrys*, Bab. Man.)

Stems procumbent, slender, very much branched, perennial, and hard but scarcely woody at the base, forming low dense tufts, from a few inches to near a foot in diameter, and often almost covered with the purple flowers. Leaves very small, ovate or oblong, fringed at the base by a very few long hairs on each side; the floral leaves similar but smaller. Flowers usually 6 in the whorl, without any other bracts

than the floral leaves, forming short, terminal, loose, leafy spikes. Calyx usually hairy, and the whole plant sometimes covered with short, rather stiff, hoary hairs.

On banks, and dry, hilly pastures, throughout Europe and northern and central Asia. Very abundant in Britain. *Fl. the whole summer.*



Fig. 781.

V. MARJORAM. ORIGANUM.

Herbs or undershrubs, with the flowers and principal characters of *Thyme*, but of taller growth, and especially differing in inflorescence. The flowers are in compact heads, with a bract under each flower at least as long as the calyx, the whole forming terminal corymbs or panicles. The calyx is also variable, in our species more regular than in *Thyme*, in some exotic ones quite as decidedly 2-lipped as in that genus, and the lips sometimes entire.

Besides our common species, the greater number of *Marjorams* are east Mediterranean, including the *sweet Marjoram* of our gardens.

1. Wild Marjoram. *Origanum vulgare*, Linn.

(Fig. 782.)

(Eng. Bot. t. 1143.)

Rootstock perennial, shortly creeping; the annual stems erect, 1 to 2 feet high, more or less hairy. Leaves stalked, ovate or ovate-lanceolate, an inch or more long, and slightly toothed. Flowers purple or rarely white, in globular compact heads, forming a terminal trichotomous panicle. Bracts ovate, about the length of the calyx. Calyx very hairy inside the mouth, with short, nearly equal teeth. Corolla twice as long as the calyx, with 4 broad, nearly equal lobes, of which the upper one is broader and nearly erect. The two longest stamens,



Fig. 782.

and sometimes all four, project beyond the corolla.

On the edges of woods, roadsides, and hilly pastures, especially in limestone districts, throughout Europe and Russian Asia, except the extreme north. In Britain, spread over England, Ireland and western Scotland. *Fl. summer.*

VI. CALAMINT. CALAMINTHA.

Branching, erect, or ascending herbs, with ovate, toothed leaves, and purplish flowers in axillary cymes, sometimes forming dense whorls, sometimes loose and paniculate. Calyx tubular, with 13 longitudinal parallel ribs (two between the midribs of the lower teeth, and one only between the midribs of the upper teeth), and 5 pointed teeth; the 3 upper teeth more or less connected at the base into an upper lip; the mouth more or less closed with hairs. Corolla-tube usually longer than the calyx; the upper lip erect and slightly concave; the lower one spreading, with 3 broad lobes. Stamens 4, in pairs under the upper lip, the outer ones the longest but not spreading beyond the corolla.

A considerable genus, spread over the temperate regions of the northern hemisphere, both in the new and the old world. It is distinguished from *Thyme* and *Marjoram* chiefly by the longer corolla and the stamens not diverging, from all the following by the arrangement of the ribs or nerves of the calyx.

Annual. Calyx-tube enlarged at the base on the lower side.

Flowers in axillary whorls of six 1. *Field C.*

Perennials. Calyx-tube not enlarged at the base.

Cymes axillary, many-flowered, forming dense whorls, with linear bracts as long as the calyxes 3. *Hedge C.*

Cymes loose, axillary, and few-flowered or loosely paniculate.

Bracts small, or none besides the floral leaves 2. *Common C.*

An American *Calamint* with red flowers is occasionally cultivated in our gardens. The common *Balm* (*Melissa officinalis*), which often establishes itself for a time as an outcast from gardens, in the southern districts of England, much resembles a *Calamint*; it is however a coarser plant, and is distinguished as a genus chiefly by a slight curve upwards in the tube of the corolla.

1. Field Calamint. *Calamintha Acinos*, Clairv. (Fig. 783.)

(*Thymus*, Eng. Bot. t. 411. *Basil Thyme*.)

A more or less branched annual, 6 or 8 inches high, and slightly downy. Leaves stalked, rather small, narrow-ovate, pointed, slightly toothed. Flowers pale-purple or white, in axillary whorls of about 6, on short, erect pedicels, without bracts. Calyx strongly ribbed; the tube much enlarged on the under side at the base, contracted again at the mouth; the teeth short and fine. Corolla in the common variety but little longer than the calyx, although occasionally near twice as long.

In waste places, or more frequently as a weed of cultivation, in Europe and western Asia, extending northward into Scandinavia. Dispersed over England, Ireland, and a portion of Scotland. *Fl. summer*.



Fig. 783.

2. Common Calamint. *Calamintha officinalis*, Moench.

(Fig. 784.)

A more or less hairy perennial; the rootstock often creeping; the stem ascending or erect, with straggling branches, 1 to 2 feet high or even more. Leaves stalked, ovate, and toothed. Flowers very variable in size, usually turned to one side, in loose cymes, which are sometimes all axillary, with 6 to 10 flowers in each, sometimes looser, on peduncles as long or longer than the leaves, and forming terminal, one-sided, leafy panicles. Calyx tubular, ribbed, not swollen at the base; the teeth finely pointed, those of the lower lip finer and longer than the upper ones.

In woods, hedges, roadsides, and waste places, in central and southern Europe and Russian Asia, but scarcely extending into northern



Fig. 784.

Germany. Frequent in England and Ireland, but not in Scotland. *Fl. summer*. The following marked varieties have been usually considered as species, but they run so much into one another that botanists are now disposed to unite them :—

a. *Small-flowered C.* (Fig. 784, *Thymus Nepeta*, Eng. Bot. t. 1414.) Rootstock scarcely creeping. Leaves about half an inch long, nearly entire. Flowers about 6 lines long, the cymes contracted into loose whorls of about 10, the corolla half as long again as the calyx. On dry, open, sunny banks. Abundant on the Continent, and not uncommon in England.

b. *Common C.* (*Thymus Calamintha*, Eng. Bot. t. 1676.) Leaves larger than in the last, and more toothed. Flowers nearly twice as long as the calyx. Intermediate between the two other varieties, and not quite so common as either.

c. *Wood C.* (*C. sylvatica*, Eng. Bot. Suppl. t. 2897.) Rootstock more creeping. Stem taller. Leaves often 2 to 3 inches long. Cymes loose. Flowers showy, often an inch long, the corolla full twice as long as the calyx. In woods, and under hedges, common on the Continent, especially in the south, but not extending in Britain beyond the Isle of Wight.

3. Hedge Calamint. *Calamintha Clinopodium*, Benth.

(Fig. 785.)

(*Clinopodium vulgare*, Eng. Bot. t. 1401. *Wild Basil*.)

Rootstock shortly creeping. Stems annual, erect or ascending, branched, and softly hairy, 1 to 2 feet high. Leaves stalked, ovate, slightly toothed, almost 2 inches long, soft and hairy. Flowers purple, in dense cymes, forming compact whorls or heads in the axils of the upper leaves, or at the ends of the branches, and surrounded by subulate, hairy bracts. Calyx about 3 lines long, with subulate, hairy teeth, the 3 upper ones shortly united by their broad base. Tube of the corolla rather longer than the calyx-teeth.

Under hedges, and on the borders of woods, throughout Europe and Russian Asia, except the extreme north. Rather frequent in England, and southern Scotland, rare in Ireland. *Fl. summer.*



Fig. 785.

VII. NEPETA. NEPETA.

Creeping or erect herbs, with flowers usually blue, in axillary whorls or terminal spikes. Calyx tubular, 15-ribbed, its mouth oblique and 5-toothed, the upper teeth usually the longest. Corolla with a rather long tube, the throat enlarged; the upper lip erect, slightly concave, notched or 2-lobed; the lower lip spreading and 3-lobed. Stamens 4, in pairs under the upper lip, the upper or inner pair the longest.

An extensive European and Asiatic genus, the great centre of which is in western Asia. With a few other exotic genera, it forms a tribe among *Labiates* known as well by the ribs of the calyx always 15, not 13 as in *Calamint*, nor 10 or 5 as in the generality of *Labiates*, as by the stamens, of which the upper or central pair project above the outer ones, whilst in most *Labiates* the outer ones project above the inner.

Stem creeping or prostrate. Flowers axillary 1. *Ground-Ivy N.*
 Stem tall and erect. Flowers in terminal spikes or clusters 2. *Calamint N.*

The *N. Nepetella*, from continental Europe, and one or two eastern species, are occasionally cultivated in flower-gardens.

1. Ground-Ivy Nepeta. *Nepeta Glechoma*, Benth.

(Fig. 786.)

(*Glechoma hederacea*, Eng. Bot. t. 853. *Ground Ivy*.)

A more or less hairy perennial, creeping and rooting at the base,



Fig. 786.

often to a considerable length; the flowering stems shortly ascending. Leaves orbicular, crenate, deeply cordate at the base, the lower ones on rather long stalks. Flowers blue, from $\frac{3}{4}$ to near an inch long, in axillary whorls of about 6; the tube of the corolla at least twice as long as the calyx.

Under hedges, on banks, edges of woods, and waste places, throughout Europe and central and Russian Asia, excepting the extreme north, extending eastward to Japan. Very abundant in Britain. *Fl. early spring.*

2. Catmint *Nepeta*. *Nepeta Cataria*, Linn. (Fig. 787.)

(Eng. Bot. t. 137. *Catmint*.)



Fig. 787.

An erect, branching perennial, 2 feet high or more, of a pale green, or somewhat hoary with minute down. Leaves stalked, ovate-cordate, pointed, and coarsely toothed, often whitish underneath. Flowers rather small, pale blue or nearly white, crowned in compact cymes, forming short, oblong spikes at the ends of the branches, with frequently one or two clusters a little lower down. Calyx softly downy, nearly as long as the tube of the corolla.

In hedges, on roadsides and waste places, throughout Europe and central and Russian Asia, except the extreme north. Tolerably frequent in the south and centre of England, and in Ireland; less so in the north, and rare in Scotland. *Fl. summer, rather late.*

VIII. **PRUNELLA.** PRUNELLA.

Low, branching, hairy perennials, with the flowers in whorls of 6,

but collected into dense terminal heads, with broad, bract-like floral leaves under each whorl, and no real bracts. Calyx 2-lipped, the upper lip flat, the lower deeply 2-lobed, the mouth not closed with hairs. Upper lip of the corolla erect, concave, short, broad, and nearly entire; the lower one spreading, 3-lobed. Stamens 4, in pairs under the upper lip, each filament with a small tooth below the anthers.

A very distinct genus, containing, besides the British one, but two species, both natives of the continent of Europe; one of which, *P. grandiflora*, chiefly distinguished by the large size of its flowers, is often cultivated in cottage-gardens.

1. Common *Prunella*. *Prunella vulgaris*, Linn. (Fig. 788.)

(Eng. Bot. t. 961. *Self-heal*.)

Stem procumbent or creeping, and rooting at the base, with ascending flowering branches, sometimes 2 or 3 inches, rarely near a foot high. Leaves stalked, ovate, and nearly entire. Spikes of flowers at first very short but lengthening out to 1 or even 2 inches, with a pair of leaves close under it. Corolla usually of a violet-purple, about 6 lines long, but varying much in size and depth of colour; the upper lip bends over the lower one, which is scarcely longer, with a broad, finely toothed middle lobe.

In pastures, on banks, etc., especially in rather moist situations, throughout Europe and central and Russian Asia, to the Arctic regions, extending also over many parts of North America, penetrating into the tropical mountains of America and Asia, and reappearing in Australia. Abundant in Britain. *Fl. summer and autumn*. In some countries it varies much more than in Britain, in stature and foliage, as well as in the size and colour of the flowers.



Fig. 788.

IX. SKULLCAP. SCUTELLARIA.

Herbs (rarely shrubby in some exotic species), usually rather weak or straggling, with the flowers always solitary in the axil of each leaf,

either all in distant axillary pairs, or, in some exotic species, forming terminal spikes or racemes. Calyx divided into 2 lips, both entire; the upper one bearing on its back a hollow scale-like protuberance. Corolla with a rather long tube, and small, nearly closed lips, the upper one concave, the lower one 3-lobed. Stamens 4, in pairs, the anthers of the lower pair 1-celled. Nuts raised on a short, oblique or curved stalk.

A rather large genus, widely distributed over the temperate and some of the warmer regions of the globe, and easily recognized, either by its inflorescence, calyx, stamens, or ovary and fruit.

Stem usually 8 inches to a foot high. Flowers blue, rather large 1. *Common S.*
Stem usually under 6 inches. Flowers pink, and small . . . 2. *Lesser S.*

Some of the Mexican or South American half-shrubby species, with scarlet flowers, are occasionally cultivated in our planthouses.

1. **Common Skullcap.** *Scutellaria galericulata*, Linn.
(Fig. 789.)

(Eng. Bot. t. 523.)



Fig. 789.

A weak, slightly downy perennial, with a slender, creeping rootstock, and slightly branched, ascending stems, 8 inches to a foot high. Leaves nearly sessile, ovate-lanceolate, slightly toothed. Flowers nearly sessile, opposite, in axillary pairs along the greater part of the stem, and all turned to one side; the corolla more than 6 lines long, of a rather dingy blue; the tube very slender below, considerably enlarged at the throat.

In wet, shady, or stony places, in Europe, northern Asia, and north-east America, extending from the Himalaya and the Caucasus to the Arctic Circle, but rarer in the Mediterranean region. Tolerably frequent in England and Ireland, less so in Scotland. *Fl. summer.*

2. **Lesser Skullcap.** *Scutellaria minor*, Linn. (Fig. 790.)

(Eng. Bot. t. 524.)

A very small, and usually more glabrous plant than the *common*

S., with slender stems, seldom 6 inches long. Leaves of the same shape, but nearly entire. Flowers shortly stalked, scarcely above 3 lines long, of a pale pink.

In moist heaths or marshy sands, chiefly in western Europe, more rare in central Europe, extending however across northern Germany into Russia and central Asia, but neither a high northern, nor scarcely a Mediterranean plant. In Britain, chiefly in western England, Ireland, and south-western Scotland. *Fl. summer.*



Fig. 790.

X. MELITTIS. MELITTIS.

A genus limited to a single species, differing from the long-flowered *Stachys* chiefly by its large calyx, usually 3-lobed, and by its axillary flowers.

1. Balm Melittis. *Melittis Melissophyllum*, Linn. (Fig. 791.)

(Eng. Bot. t. 577, and *M. grandiflora*, t. 636.)

An erect and slightly hairy perennial; the stems nearly simple, 1 to 1½ feet high. Leaves stalked, heart-shaped, and coarsely toothed, about 2 inches long. Flowers pink, or variegated with white and purple, in axillary whorls of 2 to 6, shorter than the leaves. Calyx of a thin texture, broadly campanulate, with 3 broad, rounded lobes, of which the upper one is sometimes 2- or 3-toothed. Corolla with a broad tube, near an inch long; the upper lip thrown back and slightly concave; the lower lip large, spreading, and 3-lobed. Stamens 4, in pairs, projecting slightly from the tube.

In woods and shady places, in temperate and southern Europe and western Asia, not extending into northern Germany. In Britain, confined to a few localities in southern and south-western England. *Fl. summer.*



Fig. 791.

XI. **HOREHOUND.** MARRUBIUM.

Perennial herbs, usually cottony or woolly, with much-wrinkled leaves and rather small flowers in axillary whorls or clusters. Calyx with 5 or 10 ribs and as many equal pointed teeth. Corolla with a short tube; the upper lip erect, usually notched; the lower lip spreading and 3-lobed. Stamens 4, included within the tube of the corolla, all the anthers 2-celled. Nuts rounded at the top.

A rather numerous genus in southern Europe and western Asia, readily distinguished amongst British *Labiates* by the included stamens, and in that respect allied to the extensive south European genus *Sideritis*, which however has different anthers.

1. **Common Horehound.** *Marrubium vulgare*, Linn.

(Fig. 792.)

(Eng. Bot. t. 410. *White Horehound.*)

Fig. 792.

Stem rather thick, a foot and a half high, with spreading branches, thickly covered with a white cottony wool. Leaves stalked, orbicular, soft, and much wrinkled. Flowers in dense whorls or clusters in the axils of the upper leaves, small, of a dirty white. Calyx with 10 small hooked teeth. Upper lip of the corolla narrow, erect, and 2-cleft.

On roadsides and waste places, in temperate and southern Europe and central and Russian Asia, extending northwards into Scandinavia, and now naturalized in several parts of America and other countries. Not a common plant in England or Ireland, and still more rare in Scotland, although it may occasionally be found in abundance at particular localities. *Fl. summer and autumn.*

XII. **STACHYS.** STACHYS.

Rather coarse, hairy herbs (or, in some exotic species, low shrubs), with the leaves often cordate, and flowers, in the British species, in whorls of 6 or more, forming terminal racemes, spikes, or heads. Calyx 5- or 10-ribbed, with 5 nearly equal, erect or spreading, pointed teeth.

Corolla with the upper lip erect, concave, and entire; the lower lip longer, spreading, 3-lobed, the lateral lobes often reflexed. Stamens 4, in pairs under the upper lip. Nuts smooth, rounded at the top.

A numerous genus, spread over nearly the whole world, but within the tropics limited to mountain districts.

Erect perennials, 1 to 3 feet high.

Plant thickly covered with a white silky wool. Flowers numerous, in crowded whorls. 2. *Downy S.*

Plant green, more or less hairy.

Flowers many in each whorl, forming a close, oblong terminal spike. Leaves mostly radical 1. *Betony S.*

Flowers 6 to 10 in each whorl, forming a long, loose terminal spike. Stem leafy.

Lower leaves long-stalked, ovate, deeply cordate . . . 3. *Hedge S.*

Leaves short-stalked or sessile, oblong or lanceolate, scarcely cordate 4. *Marsh S.*

Low, weak, or spreading annual, with small flowers 5. *Field S.*

The *S. annua* (Eng. Bot. Suppl. t. 2669), a low, erect, south European annual, with yellow flowers the size of those of the *marsh S.*, has been inserted in some British Floras, probably from having appeared among the weeds in some cornfield. The *S. coccinea*, from Mexico, with red flowers, and a few other exotic species, are occasionally cultivated in flower-gardens.

1. *Betony Stachys. Stachys Betonica*, Benth. (Fig. 793.)

(*Betonica officinalis*, Eng. Bot. t. 1142. *Betony*.)

A perennial, 1 to 2 feet high, more or less downy or hairy, but not woolly. Leaves mostly radical, oblong, coarsely crenate and cordate at the base; the upper ones few and distant, on short stalks or quite sessile, narrower and not cordate. Flowers in several dense whorls, collected in a close terminal, oblong head or spike, with an ovate or lanceolate bract under each calyx. Calyx-teeth erect, very pointed, almost prickly. Tube of the corolla considerably longer than the calyx; the upper lip ovate, erect, and slightly concave, about the length of the lower one. Anther-cells more distinct and less divergent than in the rest of the genus, or almost parallel.

In woods and thickets, all over Europe



Fig. 793.

and Russian Asia, except the extreme north. Abundant in England, extending into the southern counties of Scotland, very rare in southern Ireland. *Fl. summer*. Many botanists retain for this and a few exotic species the Linnæan genus *Betonica*.

2. Downy Stachys. *Stachys germanica*, Linn. (Fig. 794.)

(Eng. Bot. t. 829. *Woundwort*.)



Fig. 794.

An erect, branching perennial, 1 to 3 feet high, remarkable for the long, whitish, silky hairs which cover its stem and leaves, and especially the upper portion of the plant and the calyxes. Leaves shortly stalked, oblong-ovate or lanceolate, slightly cordate at the base, soft and silky. Flowers numerous, in dense whorls or clusters, all distinct, the lower ones sometimes rather distant, but all forming a long terminal spike, with numerous small, narrow bracts, close under the flowers. Calyx-teeth often almost prickly. Corolla tube shorter than the calyx, the upper lip very silky outside.

In waste places, and on roadsides; very common in central and southern Europe and western Asia, where it is very variable. In Britain, it has appeared occasionally in some limestone districts of England, but is perhaps not really indigenous. *Fl. summer*.

3. Hedge Stachys. *Stachys sylvatica*, Linn. (Fig. 795.)

(Eng. Bot. t. 416.)

A green, coarsely hairy perennial, with a disagreeable smell; the rootstock emitting short, thick, creeping scions; the stem stout, erect, and branching, 2 to 4 feet high. Leaves all stalked, rather large, ovate, cordate and crenate. Flowers in whorls of 6 to 10, distant from each other, forming long terminal spikes, without any bracts except the floral leaves. Calyx-teeth spreading and pointed, but not prickly.

Corolla of a dark reddish-purple, the tube longer than the calyx, the lower lip variegated with white on the upper side.

In ditches, on shady banks, and the edges of woods, throughout Europe and Russian Asia, from the Caucasus and Altai to the Arctic Circle. Very abundant all over Britain. *Fl. summer.*



Fig. 795.

4. **Marsh Stachys.** *Stachys palustris*, Linn. (Fig. 796.)

(Eng. Bot. t. 1675.)

Resembles the *wood S.* in its creeping rootstock and tall, stout stems, but the hairs are shorter and not so coarse, the smell is not so bad, and the leaves are much narrower; they are very shortly stalked, oblong or lanceolate, slightly cordate at the base, 2 to 4 inches long. Flowers of a pale bluish-purple, in whorls of 6 or 8, forming shorter and more crowded spikes than in the *wood S.*; the calyx-teeth long and pointed, but not prickly. Corolla-tube rather shorter, with a broader and somewhat shorter lower lip than in the *wood S.*

In ditches, and on moist banks, in Europe, Russian Asia, and northern America, generally a more northern plant than the *wood S.* Abundant in Britain. *Fl. summer and autumn.* A

variety with rather broader and longer-stalked leaves, and a rather longer tube to the corolla, has been distinguished under the name of



Fig. 796.

S. ambigua (Eng. Bot. t. 2089), but it appears to be connected with the common form by too close a chain of intermediates to be separable from it.

5. Field Stachys. *Stachys arvensis*, Linn. (Fig. 797.)

(Eng. Bot. t. 1154.)



Fig. 797.

A slender, hairy annual, very different in aspect from the preceding species; the stems branched, decumbent or slightly ascending, from an inch or two to nearly a foot long. Leaves small, ovate, scarcely cordate. Flowers small, of a pale purple, in whorls of 2 to 6 or 8, forming loose, leafy spikes. Calyx-teeth as long as its tube. Corolla scarcely longer than the calyx.

In fields and waste places, spread over Europe and Russian Asia, except the extreme north, and carried out with our crops even to tropical countries. Common in England, but appears only occasionally in Ireland and Scotland. *Fl. the whole season.*

XIII. GALEOPSIS. GALEOPSIS.

Erect or slightly decumbent annuals, with spreading branches, and flowers in dense whorls in the upper axils or at the summit of the branches. Calyx nearly regular, with 5 pointed teeth. Corolla with a tube longer than the calyx; the upper lip erect, concave and entire or slightly notched; the lower spreading and 3-lobed. Stamens 4, in pairs; the cells of the anthers opening by a transverse slit, bordered with hairs.

A small genus, consisting of European and north Asiatic weeds of cultivation, distinguished from *Stachys* chiefly by the anthers.

Hairs of the plant short and soft. Calyx-teeth not longer than the tube. Stem not swollen under the nodes.

- | | |
|--|---------------------|
| Flowers purple | 1. <i>Red G.</i> |
| Flowers yellow | 2. <i>Downy G.</i> |
| Hairs of the plant long and stiff. Calyx-teeth long and almost prickly. Stem swollen under the nodes | 3. <i>Common G.</i> |

1. **Red Galeopsis.** *Galeopsis Ladanum*, Linn. (Fig. 798.)
(Eng. Bot. t. 884.)

An annual, seldom above 8 or 9 inches high, with very spreading, almost decumbent branches, and covered with a very short, soft down. Leaves shortly stalked, narrow-ovate or lanceolate, coarsely toothed. Flowers purple, 6 to 10 together, in dense whorls in the upper axils, the upper ones forming a terminal head. Calyx-teeth usually very pointed, but shorter and less prickly than in the *common G.*; the tube of the corolla considerably longer than the calyx.

In cultivated and waste places, all over Europe and Russian and western Asia. Frequent in southern England, decreasing northward and eastward, but occurs also in Ireland. *Fl. summer and autumn.* It varies much in the breadth of the leaf, from ovate to nearly linear; in the degree of hairiness, and in the size of the flower.



Fig. 798.

2. **Downy Galeopsis.** *Galeopsis ochroleuca*, Lam.
(Fig. 799.)

(Eng. Bot. t. 2353.)

Very much like the *red G.*, but more densely covered with soft, almost silky hairs, which give the upper part a whitish hue, and the flowers are more numerous, considerably larger, often above an inch long, and of a pale yellow colour.

In cultivated and waste places, in temperate Europe, from Spain to Scandinavia, and eastward to south Russia. Very local in Britain, and chiefly, if not exclusively, in the north of England. *Fl. summer and autumn.* It is very doubtful whether it be more than a variety of the *red G.*, and it is even said that the one has been raised from the seeds of the other.



Fig. 799.

3. Common Galeopsis. *Galeopsis Tetrahit*, Linn. (Fig. 800.)

(Eng. Bot. t. 207. *Hemp-Nettle*.)



Fig. 800.

A coarse annual, 1 to 2 feet high or even more, although sometimes very dwarf, with a few spreading branches, green, with stiff, spreading hairs, and the stems swollen under the nodes. Leaves stalked, ovate, very pointed, and coarsely toothed. Flowers numerous, in close whorls in the axils of the upper leaves. Calyx-teeth long and almost prickly. Corolla, in the common variety, pale-purplish or white, exceedingly variable in size, sometimes not longer than the calycine teeth, more frequently twice that length, and sometimes much longer.

In cultivated and waste places, and occasionally also in woods, extending all over Europe and Russian Asia. Frequent in Britain. *Fl. summer and autumn*. The *variegated G.* (*G. versicolor*, Eng. Bot. t. 667) is a marked variety,

often considered as a distinct species. It is usually a larger plant, and the flowers are also larger, and yellow, with a purple spot on the lower lip; but in this, as in the purple variety, the size of the flower is very variable, and in some localities the two pass gradually one into the other.

XIV. **BALLOTA.** BALLOTA.

This genus, closely allied to the shorter-flowered *Stachyses*, differs chiefly in the the calyx, which is enlarged at the top, so as to be nearly funnel-shaped, and, in several exotic species, has 10 or even more teeth. The corolla, stamens, and nuts are nearly as in *Stachys*.

The exotic species belong almost exclusively to the Mediterranean region, and western Asia.

1. Black Ballota. *Ballota nigra*, Linn. (Fig. 801.) (Eng. Bot. t. 46. *B. foetida* and *B. ruderalis*, Bab. Man. *Black Horehound*.)

A coarse, erect, hairy, branching perennial, 2 to 3 feet high, softly

hairy all over, with a strong, disagreeable smell. Leaves stalked, ovate or cordate, coarsely toothed. Flowers in dense axillary clusters, often slightly stalked, and turned to one side, assuming less the appearance of whorls than in *Stachys*, usually shorter than the floral leaves, and accompanied by a number of stiff, linear bracts. Calyx 4 or 5 lines long, green or purplish, with 10 prominent ribs, and 5 broadly ovate teeth, each terminating in a fine, stiff point. Corolla purplish, with an oblong or oval, concave and somewhat arched upper lip, scarcely shorter than the 3-lobed, spreading lower lip.



Fig. 801.

On roadsides, under hedges, and in waste places, throughout Europe and Russian Asia. In Britain it extends over England, Ireland, and the south of Scotland. *Fl. summer and autumn.* It varies considerably in the precise form of the teeth of the calyx, and in the length of their point.

XV. **LEONURUS.** LEONURUS.

Erect herbs, with leaves more or less lobed, and rather small flowers in close axillary whorls, forming long, terminal, leafy spikes. Calyx with 5 prominent ribs, and 5 equal, spreading, almost prickly teeth. Corolla with a rather short tube; the upper lip erect, concave, and entire; the lower spreading, and 3-lobed. Stamens 4, in pairs. Nuts flat, and angular at the top.

A small genus, containing a few European and Asiatic species, differing from *Stachys* chiefly in the shape of the nuts, which is the same as in *Lamium*.

1. **Motherwort Leonurus.** *Leonurus Cardiaca*, Linn.

(Fig. 802.)

(Eng. Bot. t. 286. *Motherwort.*

A tall, coarse, stiff, slightly hairy or downy perennial, 2 to 4 feet high. Leaves stalked, the lower ones broad, deeply and irregularly cut into 5 or 7 coarsely toothed lobes; the floral leaves narrow, 5-lobed



Fig. 802.

or nearly entire, their stalks as long as the flowers. Flowers 6 to 15 together, in close axillary whorls, forming a long, interrupted, terminal, leafy spike. Calyx-teeth almost prickly. Corolla pink or nearly white, like that of a *Stachys*, with a rather short tube, and very hairy upper lip.

In waste places, hedges, on roadsides, etc., in Europe and central and Russian Asia; not extending, however, far to the northward. Indicated in several parts of England and southern Scotland, but with considerable doubts as to its being really indigenous. *Fl. end of summer.*

XVI. **LAMIUM.** LAMIUM.

Hairy herbs, either annual or perennial, decumbent at the base; the lower leaves always stalked, ovate or orbicular, and toothed; the flowers in close axillary whorls, or the upper ones in a leafy head. Calyx as in *Stachys*. Corolla-tube slender at the base, much enlarged at the throat; the upper lip erect or arched, slightly concave, entire or slightly notched; the lower spreading, with a broad middle lobe; the two lateral ones either smaller and pointed, or more often reduced to a small tooth. Anthers hairy in all the British species except the yellow *L.*

A genus of several species, chiefly south European or central Asiatic, generally distinguished either by the long, arched upper lip, or by the smallness of the lateral lobes of the lower lip of the corolla.

Annuals, with small flowers, in few, nearly terminal, leafy whorls.

Floral leaves sessile, orbicular, obtusely crenate 1. *Henbit L.*

Floral leaves shortly stalked, ovate, often pointed 2. *Red L.*

Perennials, with rather large flowers in axillary whorls.

Flowers white 3. *White L.*

Flowers red 4. *Spotted L.*

Flowers yellow 5. *Yellow L.*

1. **Henbit *Lamium* amplexicaule, Linn.**
(Fig. 803.)

(Eng. Bot. t. 770. *Henbit*.)

A low, decumbent, much branched annual, a few inches, or, when very luxuriant, near a foot long. Lower leaves small, orbicular, on long stalks; the floral ones closely sessile, broadly orbicular, and deeply crenate or cut. The flowers form 1, 2, or 3 compact whorls. Calyx softly hairy, with short teeth. Corolla about half an inch long, of a purplish-red, with a slender tube; the lateral teeth of the lower lip scarcely perceptible.

In cultivated and waste places, throughout Europe and central and Russian Asia, except the extreme north. Extending all over Britain. *Fl. the whole season*. A variety with rather longer teeth to the calyx, and more distinct lateral teeth to the lower lip of the corolla, is occasionally found mixed with the common one, especially in the more northern localities, and has been distinguished as a species, under the name of *L. intermedium* (Eng. Bot. Suppl. t. 2914).



Fig. 803.

2. **Red *Lamium* *Lamium* purpureum, Linn.** (Fig. 804.)
(Eng. Bot. t. 769.)

A spreading annual, like the *henbit* *L.*, and the lower leaves are likewise small and orbicular, on long stalks; but the upper leaves, even the floral ones, are all shortly stalked, and ovate, heart-shaped, or triangular, often pointed, and, in the common variety, less deeply toothed. Calyx-teeth fine, and spreading. Corolla of a purplish-red, shorter than in the *henbit* *L.*, with a broader, more open tube, and a more hairy upper lip; the lower lip with a short, fine tooth on each side.

In cultivated and waste places, throughout Europe and western Asia, except the extreme north. In Britain, more common than the *henbit* *L.*, especially as a garden weed. *Fl. the whole season*.



Fig. 804.

A variety with the upper leaves deeply cut, which occurs occasionally in western Europe, and has been found also in England and Scotland, has been described as a species, under the name of *L. incisum* (Eng. Bot. t. 1933).

3. White Lamium. *Lamium album*, Linn. (Fig. 805.)

(Eng. Bot. t. 768. *Dead-Nettle*.)



Fig. 805.

A rather coarse, hairy perennial, with a shortly creeping stock, and decumbent or ascending, branching stems, seldom above a foot high. Leaves stalked, coarsely crenate. Flowers pure white, in close axillary whorls of 6 to 10 or more. Calyx-teeth long, fine and spreading. Tube of the corolla curved upwards, and longer than the calyx, with an oblique contraction near the base, corresponding with a ring of hairs inside; the upper lip long and arched; the lateral lobes of the lower one slightly prominent, with a long, fine tooth.

Under hedges, on banks, and waste places, throughout Europe and Russian Asia, except the extreme north. Extends all over Britain, although becoming rare in the Scotch Highlands. *Fl. the whole season.*

The leaves are occasionally marked by a white line or spot in the centre, but less frequently so than in the following species.

4. Spotted Lamium. *Lamium maculatum*, Linn.

(Fig. 806.)

(Eng. Bot. t. 2550.)

Closely resembles the *white L.* in every respect except in the colour of the flower, which is purple-red instead of white, and in the ring of hairs in the tube of the corolla, which is transverse instead of oblique. The leaves are also more frequently marked in the centre with a broad white line or spot. It is still very doubtful whether it may not be a mere variety of the *white L.*, with which I had formerly united it.

With nearly the same geographical range as the *white L.*, it is, however, rather more southern. In Britain it is rare, and perhaps only introduced, as it has been long cultivated in cottage gardens, and spreads readily by its offsets.
Fl. summer.



Fig. 806.

5. Yellow Lamium. *Lamium Galeobdolon*, Crantz.
 (Fig. 807.)

(*Galeobdolon luteum*, Eng. Bot. t. 787. *Archangel*.)

Stock perennial as in the last two, but the stems are longer and less branched, often a foot and a half high. Leaves stalked, ovate, toothed, but scarcely cordate. Flowers bright yellow, in dense axillary whorls; the calyx-teeth short; the tube of the corolla scarcely longer than the calyx; the upper lip long and arched; the lateral lobes of the lower lip narrow, but not much smaller than the central one. Anthers glabrous as in some exotic species, not hairy as in the other British ones.

In woods and shady places, in Europe and western Asia, extending northwards into southern Scandinavia. Not uncommon in England and Ireland, but rare, if really indigenous, in Scotland.
Fl. spring and early summer.



Fig. 807.

XVII. **GERMANDER.** TEUCRIUM.

Herbs or undershrubs, varying much in habit; the flowers few in each whorl, usually turned to one side. Calyx of 5 teeth, often arranged in two lips. Corolla apparently without an upper lip; the 2 upper lobes forming 2 small teeth, one on each side of the base of the lower lip, which has thus 5 lobes, the middle one large and concave. Stamens 4, protruding between the two upper teeth of the corolla.

A numerous genus, spread over all parts of the world, and always known by the shape of the corolla.

Flowers all axillary. Calyx-teeth nearly equal 2. *Water G.*
Flowers in terminal one-sided spikes or racemes.

Flowers pale-yellow, 2 to each whorl. Calyx with 1 broad
and 4 small teeth 1. *Wood G.*

Flowers purple-red, 4 to 6 in each whorl. Calyx-teeth nearly
equal 3. *Wall G.*

1. **Wood Germander.** *Teucrium Scorodonia*, Linn.

(Fig. 808.)

(Eng. Bot. t. 1543. *Wood Sage*.)



Fig. 808.

Rootstock creeping, the stems ascending or erect, hairy, about a foot high, slightly branched, hard and almost woody at the base. Leaves stalked, ovate or lanceolate, coarsely toothed, much wrinkled, downy, and green on both sides. Flowers of a pale yellow, in pairs, with a small bract under each pedicel, forming terminal and axillary one-sided-racemes. Upper tooth of the calyx very broad and turned back, the 4 lower teeth small. Tube of the corolla slender, twice as long as the calyx; the lip almost as long, with a terminal concave lobe and two small lateral teeth on each side.

In woods and hedges, throughout Europe and Russian Asia, except the extreme north. Abundant in England, Ireland, and the greater part of Scotland. *Fl. summer and autumn.*

2. **Water Germander. *Teucrium Scordium*, Linn. (Fig. 809.)**
(Eng. Bot. t. 828.)

A low, branching perennial, procumbent and rooting at the base, or emitting creeping scions, and usually covered with short, soft hairs. Leaves oblong, $\frac{1}{2}$ to 1 inch long, coarsely toothed, usually narrowed at the base, but larger and cordate in luxuriant specimens. Flowers of a pale purplish-red, all axillary, turned to one side, in whorls of 6 or fewer, the pedicels very slender. Calyx small, with 5 nearly equal teeth.

In wet, marshy places, generally dispersed over Europe and central and Russian Asia, except the extreme north. Rare in Britain, having been only found in a few localities in Ireland, and in Cambridgeshire, Devonshire, and perhaps one or two other English counties. *Fl. summer.*



Fig. 809.

3. **Wall Germander. *Teucrium Chamædrys*, Linn.**
(Fig. 810.)

(Eng. Bot. t. 680.)

Stock perennial, almost woody; the stems rarely branched, ascending, hairy, 6 to 8 inches high. Leaves ovate, deeply toothed, wedge-shaped at the base, green, and more or less hairy on both sides. Flowers reddish-purple, in whorls of 2 to 6, forming a short, rather loose, terminal, one-sided raceme. Calyx loosely tubular, with 5 almost equal, pointed teeth.

On stony banks and old walls, over the greater part of central and southern Europe and western Asia, but not extending into Scandinavia. In Britain, it has been found only in a few localities, mostly on old walls or ruins, and may in many cases have originally escaped from gardens, although now well established. *Fl. summer.*

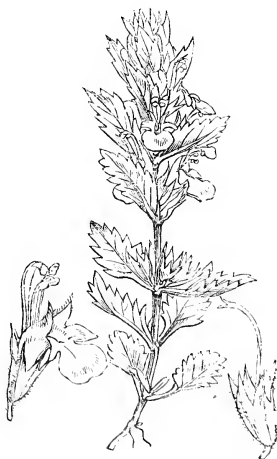


Fig. 810.

XVIII. **BUGLE.** *AJUGA*.

Low herbs, with purplish-blue or yellow flowers, in close whorls in the upper axils, often forming terminal leafy spikes; the corolla withering but remaining attached after flowering. Calyx 5-cleft. Corolla with a distinct tube; the upper lip very short, erect, and entire or nearly so; the lower lip longer and spreading, as in *Germander*. Stamens in pairs, projecting beyond the upper lip or tooth of the corolla. Nuts rough or wrinkled.

A rather extensive genus, spread over Europe, Asia, Africa, and Australia, but unknown in America, differing from *Germander* in the tooth-like upper lip of the corolla, and still more in habit.

Leaves entire or coarsely toothed. Flowers blue or ash-coloured.

Plant glabrous or slightly hairy, with creeping scions . . . 1. *Creeping B.*

Plant very hairy, without creeping scions 2. *Erect B.*

Leaves deeply divided into linear lobes. Flowers yellow . . . 3. *Yellow B.*

1. **Creeping Bugle.** *Ajuga reptans*, Linn. (Fig. 811.)

(Eng. Bot. t. 489, and *A. alpina*, Eng. Bot. t. 477.)



Fig. 811.

The whole plant is glabrous, or with a few hairs chiefly amongst the flowers. The short stock emits creeping scions and a tuft of radical leaves, which are obovate, 1 to 2 inches long, entire or broadly crenate, and narrowed into a stalk nearly as long as the leaf. Flowering stems erect, often only 2 or 3 inches, rarely near a foot high, with short, ovate or obovate, nearly sessile leaves; the upper ones often coloured, small, and bract-like. Flowers in close whorls in the axils of nearly all the leaves; the upper ones forming a cylindrical leafy spike. Corolla blue, or rarely flesh-colour or white, with the tube much longer than the calyx.

In pastures and woods, throughout Europe and western Asia, except the extreme north. Abundant in Britain. *Fl. spring and early summer.*

2. **Erect Bugle.** *Ajuga genevensis*, Linn. (Fig. 812.)

(*A. pyramidalis*, Eng. Bot. t. 1270.)

Much like the *creeping B.*, but has no creeping scions, and is much

more hairy; the stock has a tuft of rather large, spreading radical leaves, and one or more erect or ascending flowering stems, with the leaves often coarsely toothed. Calyx very hairy. Floral leaves in the pyramidal variety, the only one found in Britain, broadly ovate, longer than the flowers, and crowded with them in a pyramidal or quadrangular leafy spike.

The species has a very wide range over Europe, and central and Russian Asia, to the Himalayas and China, although not an Arctic plant. The pyramidal variety, common in northern Europe and the great mountain-ranges of central Europe, is the only British form; it occurs but rarely in the Scotch Highlands, and has been found by Mr. D. Moore in the great island of Arran, off the coast of Ireland. *Fl. early summer.*

This variety is usually distinguished as a species, but its peculiarities appear to be owing to station, and it is never more marked than in recently burnt pastures.



Fig. 812.

3. Yellow Bugle. *Ajuga Chamæpitys*, Schreb. (Fig. 813.)

(Eng. Bot. t. 77.)

A low, much branched, hairy annual. Leaves much crowded, and deeply divided into 3 linear lobes; the lateral ones sometimes again divided. Flowers yellow, in axillary pairs, always shorter than the leaves.

In dry, cultivated, and waste stony places, roadsides, etc., chiefly in limestone soils, in central and southern Europe and western Asia, extending northwards over the greater part of Germany. In Britain, limited to some of the south-eastern or eastern counties of England. *Fl. the whole season.*



Fig. 813.

LVI. THE VERVEIN FAMILY. VERBENACEÆ.

Herbs, shrubs, or trees, with opposite or rarely alternate leaves. Flowers of *Labiates*, except that the ovary is entire, with the style proceeding from the top. Fruit dry or succulent, usually shorter than the persistent calyx, 2- or 4-celled, with 1 seed in each cell.

A large family, chiefly, American or from the warmer regions of Asia and Africa. Besides the numerous cultivated species of *Vervein*, several exotic genera, such as *Lantana*, *Vitex*, etc., are familiar to our gardeners.

I. VERVEIN. VERBENA.

Herbs or rarely shrubs, with opposite stem-leaves, and alternate flowers in terminal spikes. Calyx 5-toothed. Corolla with a distinct tube, and a rather unequally 5-cleft, spreading limb. Stamens 4, or rarely only 2, included in the tube. Fruit enclosed in the calyx, dividing into 4 one-seeded nuts.

A genus confined in Europe to one or two species, but comprising numerous American ones, which have been still more multiplied in our gardens by the more or less permanent varieties or races produced by cultivation.

1. Common Vervein. *Verbena officinalis*, Linn. (Fig. 814.)

(Eng. Bot. t. 767.)



Fig. 814.

A nearly glabrous, erect perennial, 1 to 2 feet high, with long, spreading, wiry branches. Lower leaves obovate or oblong, stalked, and coarsely toothed or cut; the upper ones few, sessile, and lanceolate. Flowers very small, in long, slender spikes, the lower ones becoming distant as the spike lengthens, each one sessile in the axil of a small bract.

On roadsides and in waste places, in central and southern Europe and Asia, extending northwards into southern Sweden. Frequent in the southern counties of England, rare in the north and in Ireland, and almost unknown in Scotland. *Fl. summer and autumn.*

LVII. PLUMBAGO FAMILY. PLUMBAGINEÆ.

Herbs, or rarely undershrubs, usually hard and stiff; the leaves mostly or entirely radical; the flowers in terminal heads, spikes, or panicles. Calyx tubular, often enlarged and petal-like at the top. Corolla of 5 petals, often united at the base. Stamens 5, inserted at the base of the corolla or between the petals. Ovary single, with one cell, and a single, suspended ovule, but bearing 5 styles, either quite distinct or united below the middle. Capsule either indehiscent or opening irregularly, and enclosing a single seed.

A small family, extending over most parts of the world, but chiefly within the influence of the sea air, or occasionally on high mountains. Besides the two British genera, some species of *Plumbago* or *Leadwort* (which gives its name to the family) are cultivated as ornamental plants in our gardens.

Flowers in terminal panicles or spikes. Styles glabrous . . . 1. *STATICE*.
Flowers in globular heads. Styles hairy at the base . . . 2. *THRIFT*.

I. **STATICE.** STATICE.

Flowers solitary or two or three together, in little spikelets within 2 bracts, these spikelets forming one-sided spikes, arranged either in a dichotomous or trichotomous panicle, or, in some exotic species, forming a single spike. Calyx more or less expanded at the top into a dry, membranous, coloured, and slightly 5-lobed limb, each lobe traversed by a green or dark nerve. Petals slightly united at the base, the stamens inserted at their point of union. Styles glabrous.

The geographical range is the same as that of the family, of which this genus includes the great majority of species.

Leaves usually several inches long, the veins pinnate (when visible). Panicle very spreading and corymbose . . . 1. *Common S.*
Leaves usually not above an inch, with 1 or 3 ribs, and no pinnate veins. Panicle elongated, usually one-sided.
Branches all or nearly all flowering 2. *Rock S.*
Short, flowerless, intricate branches very numerous . . . 3. *Matted S.*

Several exotic species are occasionally cultivated in our flower-gardens or planthouses.

1. Common Statice. *Statice Limonium*, Linn. (Fig. 815.)(Eng. Bot. t. 102. *Sea Lavender*.)

Fig. 815.

Stock short and thick, with tufts of radical leaves from 2 to 5 or 6 inches long, obovate or oblong, quite entire, glabrous, and narrowed at the base into a long stalk; the midrib is alone prominent when fresh, but when dry the lateral reticulate veins branching from it distinctly appear. Flower-stem erect, leafless, 6 inches to a foot or even more high, repeatedly forked, so as to form a broad corymbose panicle, with a membranous bract at each division. Flowers numerous, in short, rather loose spikes at the end of the branches, with a green bract, coloured at the edge, under each flower. Calyx green at the base, dry, scarious, and of a pale purple in its upper part, with 5 short, broad teeth, which are often slightly toothed or jagged. Petals of a bluish purple, at

the time of flowering rather longer than the calyx, but the latter becomes subsequently much enlarged, so as to assume the appearance of a corolla concealing the real one.

In maritime sands and salt-marshes, on the coasts of western Europe, the Mediterranean, and western Asia, and apparently the same species on the South American and Californian sea-shore. Frequent on the coasts of England and Ireland, very local on those of Scotland. *Fl. summer and autumn*. A small variety, with less compact spikes, has been described as a species, under the name of *S. bahusiensis* (*S. rariflora*, Eng. Bot. Suppl. t. 2917). It grows in the same situations, and is often very difficult to distinguish, even as a variety.

2. Rock Statice. *Statice auriculæfolia*, Vahl. (Fig. 816.)(*S. binervosa*, Eng. Bot. Suppl. t. 2663. *S. Dodartii* and *S. occidentalis*, Bab. Man.)

Resembles in many respects the *common S.*, but the tufted stock is more branched and compact. The leaves are much smaller, usually scarcely one inch, and rarely two inches long, with shorter stalks, and, when dry, often show a lateral nerve on each side of the midrib, but never any diverging veins. Stems about 6 to 10 inches high. Spikes

more compact, with rather larger flowers than in the *common S.*, but the spikes themselves are fewer and more distant, forming an elongated, not a corymbose panicle. The bracts are greener and longer.

On dry, rocky, maritime banks, or more rarely in sands, on the shores of western Europe, penetrating also far along the Mediterranean. In Britain, it extends up the west coast to Wigtonshire, but not beyond Lincolnshire on the east coast, and occurs in Ireland. *Fl. summer.*



Fig. 816.

3. Matted Statice. *Statice reticulata*, Linn. (Fig. 817.)

(Eng. Bot. t. 328.)

This is a still smaller plant than the last, with leaves often not more than 6 lines long; the lower branches of the panicle numerous, very much branched, and usually without flowers, whilst the central ones bear numerous short spikes of small flowers, with the bracts white and scarious nearly from the base.

In maritime sands, all round the Mediterranean and in western Asia, extending more sparingly up the west coast of France. In Britain, only in the counties of Norfolk, Cambridge, and Lincoln. *Fl. summer.*



Fig. 817.

II. THRIFT. ARMERIA.

Flowers in a terminal, globular head, intermixed with scarious scales,

of which the outer ones form a kind of involucre, and the two outermost of all are lengthened below their insertion into appendages forming a sheath round the upper part of the peduncle. Calyx usually drier and more scarious than in *Statice*, the petals scarcely united at their very base, and the styles hairy in the lower part.

A genus of very few species, separated from *Statice* chiefly on account of their inflorescence, which gives them a peculiar habit.

Leaves narrow-linear, 1-nerved. Teeth of the calyx short. . . 1. *Common T.*

Leaves lanceolate-linear, 3- or 5-nerved. Teeth of the calyx long

and fine 2. *Plantain T.*

1. Common Thrift. *Armeria vulgaris*, Willd. (Fig. 818.)

(*Statice Armeria*, Eng. Bot. t. 226. *A. maritima*, Brit. Fl.)

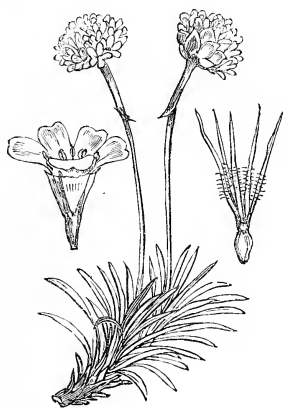


Fig. 818.

The stock forms perennial tufts, with numerous radical leaves, all narrow-linear, entire, with a single prominent midrib. Flowering stems simple and leafless, glabrous or shortly downy, 3 or 4 inches to twice that height, each bearing a globular head of pink or sometimes white flowers; the petal-like border of the calyx crowned by 5 very short, slender teeth.

On muddy or sandy sea-shores, and on maritime rocks, in the northern hemisphere, from the Arctic regions to near the tropics, reappearing in the southern hemisphere beyond the tropics, and also at considerable elevations in the high mountain-chains of Europe and Asia. Abundant on our British coasts

and on the tops of some of the Scotch mountains. *Fl. summer.*

2. Plantain Thrift. *Armeria plantaginea*, Willd.

(Fig. 819.)

(Eng. Bot. Suppl. t. 2928.)

Very near the last, and perhaps one of its numerous forms, but the leaves are much broader, usually marked with 3 or 5 parallel nerves,

the flower-stalk is often a foot high or more, and the slender teeth of the calyx are much longer than in the *common T.*

On sandy heaths and wastes, in western Europe, extending northward to the English Channel and eastward to the Rhine. In our flora only in the Channel Islands. *Fl. summer.*



Fig. 819.

LVIII. PLANTAIN FAMILY. PLANTAGINEÆ.

Herbs, with radical, tufted or spreading leaves, and leafless flower-stalks, bearing a simple spike or a single terminal flower (the stem in some exotic species becoming elongated, branched, and leafy). Sepals 4. Corolla small, scarious, with an ovate or cylindrical tube, and 4 spreading lobes. Stamens 4, alternating with the lobes of the corolla, and usually very long. Ovary 1-, 2-, or 4-celled, with one or more ovules in each cell, and terminating in a long, simple style. Capsule opening transversely or indehiscent.

A small Order, widely spread over the globe, but most abundant in the temperate regions of the old world.

- Flowers hermaphrodite, in terminal heads or spikes 1. PLANTAIN.
 Flowers unisexual, solitary or two together, the males stalked,
 the female sessile amongst the leaves 2. LITTOREL.

I. PLANTAIN. PLANTAGO.

Flowers hermaphrodite, in heads or spikes on a leafless peduncle. Capsule 2- or 4-celled, with 2 or more seeds.

The genus comprises the whole family, with the exception of the single species of *Littorel*.

Leaves ovate or lanceolate, strongly ribbed.

Leaves very broad, stalked. Spike long. Capsule several-seeded 1. *Greater P.*

Leaves ovate, almost sessile. Spike cylindrical. Capsule 2-seeded 2. *Hoary P.*

Leaves lanceolate. Spike ovoid or shortly cylindrical. Capsule 2-seeded 3. *Ribwort P.*

Leaves linear, entire or pinnatifid.

Leaves entire or very slightly toothed. Ovary 2-celled 4. *Sea P.*

Leaves deeply toothed or pinnatifid. Ovary 4-celled 5. *Buckshorn P.*

1. Greater Plantain. *Plantago major*, Linn. (Fig. 820.)

(Eng. Bot. t. 1558.)



Fig. 820.

Rootstock short and thick. Leaves erect or spreading, broadly ovate, often 4 or 5 inches long and nearly as broad, entire or toothed, glabrous or downy, marked with 7 (rarely 9 or only 5) prominent, parallel ribs, converging at the base into a rather long footstalk. Peduncles usually longer than the leaves, bearing a long, slender spike of sessile flowers, smaller than in the two following species. Sepals green in the centre, scarious on the edges. Stamens longer than the corolla, but shorter than in the two following species. Capsule 2-celled, with from 4 to 8 seeds in each cell.

In pastures, on roadsides, and in waste places, throughout Europe and Russian and central Asia, and has spread with cultivation over almost every part of the globe. Very abundant in Britain. *Fl. summer and autumn*. It varies much in size; the spike of flowers is seldom less than 2 inches, sometimes as much as 6 inches, long.

2. Hoary Plantain. *Plantago media*, Linn. (Fig. 821.)

(Eng. Bot. t. 1559.)

Rootstock thick, almost woody, and branched as in the *ribwort P.* Leaves ovate, sessile, usually closely spreading on the ground, more or

less hoary with a short down, and marked with 5 or 7 ribs. Peduncles long and erect, bearing a dense cylindrical spike, shorter and much thicker than in the *greater P.*, but yet longer than in the *ribwort P.*, varying from 1 to near 2 inches in length. Flowers and capsules of the *ribwort P.*, except that the 4 sepals are free, the corolla more silvery, and the stamens pink or purple. Ovary with 2 seeds in each cell, but they often do not all ripen, and the capsule has then but 3 or 2 altogether.

In dry, close pastures, chiefly in limestone districts, in most parts of Europe and western Asia. Abundant in similar situations in England and the south of Scotland, but not in Ireland. *Fl. early summer, and often again in autumn.*

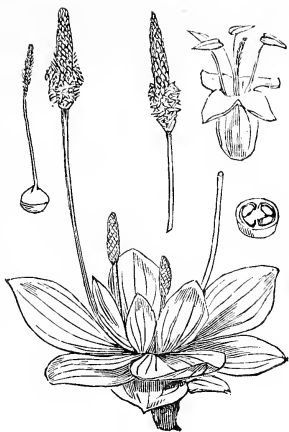


Fig. 821.

3. Ribwort Plantain. *Plantago lanceolata*, Linn.

(Fig. 822.)

(Eng. Bot. t. 507. *Ribwort.*)

Rootstock short, but thick and woody, and often much branched, bearing tufts of woolly hairs among the leaves. Leaves erect or spreading, lanceolate, varying much in size, but usually 2 to 4 inches long, slightly hairy, with 3 or 5 ribs, and more or less tapering into a stalk at the base. Peduncles longer than the leaves, erect and angular. Spike ovoid or oblong, usually 6 lines to near an inch long, but sometimes very small and globular, or, in very luxuriant specimens, becoming cylindrical, and exceeding an inch. Sepals scarious, marked with a prominent green rib; the 2 lower ones often combined into one. Stamens more than twice as long as the corolla, with slender white filaments and yellow anthers. Capsule with 2 hemispherical seeds attached to the partition by their inner face.



Fig. 822.

In meadows, pastures, and waste places, with the same widely extended geographical range as the *greater P.*, and equally abundant in Britain. *Fl. the whole season.*

4. Sea Plantain. *Plantago maritima*, Linn. (Fig. 823.)

(Eng. Bot. t. 175.)

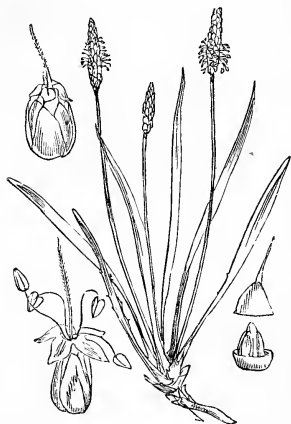


Fig. 823.

Stock often more branched than in the preceding species, with some long hairs in tufts among the leaves. Leaves narrow-linear, thick and fleshy, pointed, entire or slightly toothed, with scarcely prominent ribs. Peduncles cylindrical, longer than the leaves. Spike cylindrical, 1 to 2 inches long, not so dense or so thick as in the two preceding species. Flowers rather smaller than in the *ribwort P.* Sepals all usually distinct. Capsules with 2 seeds only.

On muddy sea-shores, and in salt-marshes, in Europe, central Asia, at the northern and western extremities of America, and in South Africa. It occurs also occasionally inland, especially in the principal mountain-ranges of Europe. Frequent on the British coasts and in some of the Scotch Highlands. *Fl. late in summer, and autumn.*

5. Buckshorn Plantain. *Plantago Coronopus*, Linn.

(Fig. 824.)

(Eng. Bot. t. 892.)



Fig. 824.

Rootstock short and thick, scarcely branched. Leaves spreading, in a dense tuft, linear or linear-lanceolate, or pinatifid with linear segments, more or less hairy, with scarcely prominent ribs. Spikes cylindrical, 1 to 2 inches long. The flowers rather smaller than in the *sea P.*; the sepals broad and ciliate. Ovary with 4 cells, each with a single ovule, but it often happens that only 1 or 2 in each capsule attain their maturity.

In dry, stony, or sandy situations, especially near the sea, in Europe, north Africa, and western Asia. Common in Britain. *Fl. summer and autumn.*

II. LITTOREL. LITTORELLA.

A single species, distinguished generally from *Plantain* by the inflorescence, the monœcious flowers, and a 1-seeded, indehiscent fruit.

1. Common Littorel. *Littorella lacustris*, Linn. (Fig. 825.) (Eng. Bot. t. 468.)

The small perennial rootstock bears a tuft of bright green, narrow-linear, entire radical leaves, from $1\frac{1}{2}$ to 3 inches long. Male peduncles radical, about an inch long, with a single or rarely two terminal flowers, and a small bract lower down. Sepals narrow. Corolla like that of a *Plantain*, but with small lobes. The stamens, which form the most conspicuous part of the plant, have slender filaments, full half an inch long, terminated by large, ovate anthers. Female flowers concealed amongst the leaves, consisting of a sessile calyx, split into 3 or 4 unequal sepals, enclosing a small ovary, with a long, thread-like style. Fruit a small nut.



Fig. 825.

In mud and wet sand, on the margins of pools, in northern Europe, extending far into the Arctic regions, but chiefly confined to mountains in central and southern Europe. Appears to be widely distributed in Britain, though seldom observed, for it often remains under water without flowering, when its leaves become longer and grass-like. *Fl. summer.*

LIX. PARONYCHIA FAMILY. PARONYCHIACEÆ.

Low herbs, either annual or with a perennial, sometimes woody stock, and annual flowering branches, usually spreading or de-

cumbent; opposite or rarely alternate leaves; small, scarious stipules (rarely deficient); and small, often granular flowers, in terminal or axillary cymes or bunches, rarely solitary. Calyx shortly or deeply divided into 5, rarely 4 or 3 lobes or segments. Petals usually none, or represented by 5 small filaments, or rarely as many as the sepals and inserted at their base. Stamens as many as the sepals, rarely fewer, inserted between the filaments or petals when present. Ovary and capsule 1-celled. Styles or sessile stigmas 2 or 3. Seeds solitary (or rarely several, on a free, central placenta, as in the *Pink* family), with a curved embryo, and mealy albumen.

A small Order, widely diffused over the globe, intermediate, as it were, between the *Pink* family, next to which it was placed in the former edition of this work, and the *Amarantus* family, to which it appears on the whole the most nearly allied, for the petals, except in *Corrigiole*, are reduced to small filaments which may be considered as imperfect stamens, or are altogether wanting, as in *Amarantaceæ*, thus placing them amongst *Monochlamyds*.

Leaves alternate I. CORRIGIOLE.

Leaves opposite.

Calyx with a distinct ovoid or globular tube IV. SCLERANTH.

Calyx divided almost to the base.

Flowers green. Calyx without points II. HERNIARY.

Flowers white and scarious. Calyx with fine points . III. ILLECEBRUM.

I. CORRIGIOLE. CORRIGIOLA.

Annuals, with alternate leaves, and small white flowers in terminal cymes. Calyx of 5 divisions. Petals 5, oblong or oval. Stamens 5. Stigmas 3, sessile. Seed solitary, in a small nut, enclosed in the calyx.

Besides the British species there are two or three others in southern Europe, Africa, and South America, all seacoast plants.

1. Sand Corrigiole. *Corrigiola littoralis*, Linn. (Fig. 826.)

(Eng. Bot. t. 668. *Strapwort*.)

Stems numerous, procumbent or ascending, slightly branched, slender, and glabrous. Leaves linear or oblong, obtuse, tapering at the base, with a minute scarious stipule on each side. Flowers crowded in little heads or cymes at the ends of the branches; the white, ovate or oblong petals barely protruding beyond the calyx, whose divisions however are white and petal-like on the margin, and green in the centre only. Nuts enclosed, when ripe, in the scarcely enlarged calyx.

On the sandy seashores of western and southern Europe, and northern Africa, extending sparingly into the east Mediterranean region, and western Asia, occurring here and there more inland in west-central Europe. In Britain, confined to the coasts of Devon and Cornwall. *Fl. summer and autumn.*



Fig. 826.

II. **HERNIARY.** *HERNIARIA.*

Herbs, either annual or with a perennial stock of short duration; with prostrate, much branched, annual stems; opposite leaves; very minute, scarcely visible scarious stipules; and small, green, granular flowers, crowded in little axillary cymes. Calyx of 5 divisions. Stamens 5, alternating with 5 small filaments. Stigmas 2. Seed solitary in a thin, indehiscent capsule enclosed in the calyx.

A genus of very few species, all growing in sandy places, chiefly near the sea, in southern Europe, central Asia, and Africa.

1. **Common Herniary.** *Herniaria glabra*, Linn. (Fig. 827.)

(Eng. Bot. t. 206, and *H. ciliata*, Eng. Bot. Suppl. t. 2857.

Rupture-wort.)

The very much branched stems spread along the ground to the length of a few inches, and are usually crowded from the base with their little green flowers intermixed with small, obovate, or rarely orbicular leaves. The whole plant is glabrous, with the exception of a few usually recurved hairs at the edges of the leaves.

In sandy places, in temperate and southern Europe and Russian Asia, extending into Scandinavia, but not to high latitudes. In Britain, it occurs in several counties of southern and central England, and in Ireland. *Fl. summer.*

It varies with the clusters of flowers all crowded into a leafy spike, or the lower ones separated by considerable intervals.



Fig. 827.

III. **ILLECEBRUM.** ILLECEBRUM.

Calyx of 5 thickish white divisions, hooded at the top, with subulate points. Stamens 5, alternating with 5 small filaments. Stigmas 2, sessile. Seed solitary, in a capsule enclosed in the calyx, but opening at the base in 5 or 10 valves, which remain cohering at the top.

A genus now reduced to a single species, but which formerly included several south European ones, now forming the genus *Paronychia*.

1. **Whorled Illecebrum.** *Illecebrum verticillatum*, Linn.
(Fig. 828.)

(Eng. Bot. t. 895.)



Fig. 828.

A small, glabrous, much branched annual, prostrate and spreading at the base; the branches ascending from 1 to 3 inches in height, covered in their whole length with the shining white whorls of the flowers, in the axils of opposite, obovate, green leaves. Sepals somewhat enlarged after flowering, but even then but little more than half a line long, green on the inner edge, but thickened and of a pure white on the back, with a

fine point, giving the whole calyx a 5-ribbed form, something like the capsule of a *Sedum*. Petals, stamens, and ovary very minute.

In sands, and especially in sandy marshes, in central and southern Europe, from the west coast to the Russian frontier. In Britain, only in Devonshire and Cornwall. *Fl. summer*.

IV. **SCLERANTH.** SCLERANTHUS.

Small, much branched herbs, with opposite, narrow leaves, connected by a narrow, transparent edge at the base; and numerous small, green flowers, in crowded, terminal cymes. Calyx-tube ovoid or campanulate, the limb 5-lobed. Stamens 5, alternating with the 5 small filaments, all inserted at the top of the calyx-tube. Styles 2. Seed solitary in a little nut, enclosed in the somewhat hardened tube of the calyx.

Besides the two British species, the genus comprises two or three

from southern Europe, closely resembling them, and perhaps mere varieties.

Root annual. Calyx-lobes pointed 1. *Annual S.*
 Stock perennial. Calyx-lobes obtuse, edged with white . . 2. *Perennial S.*

1. Annual Scleranth. *Scleranthus annuus*, Linn. (Fig. 829.)

(Eng. Bot. t. 351. *Knawel*.)

A much branched, erect or spreading annual, 2 to 3 inches high, glabrous or very slightly downy. Leaves very narrow, 2 to 3 lines long. Calyx enlarged after flowering to about $1\frac{1}{2}$ lines in length; the lobes stiff, erect, narrow, and pointed, about equal in length to the tube.

In fields and waste places, over the whole of Europe and western Asia, except the extreme north. Abundant in England, Ireland, and southern Scotland, but scarce in the north. *Fl.* all summer.

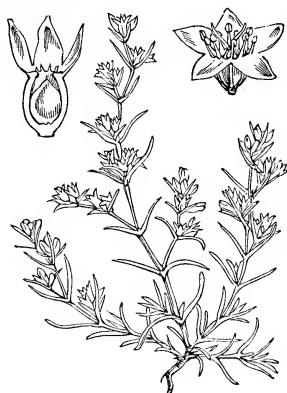


Fig. 829.

2. Perennial Scleranth. *Scleranthus perennis*, Linn.

(Fig. 830.)

(Eng. Bot. t. 352.)

This species so much resembles the *annual S.* that it is by some considered as a mere variety, but the root and tufted lower part of the stem will last two or three years. The flowering stems, usually about 2 inches high, are more rigid, the flowers more densely collected in terminal cymes, and the calyx is rather smaller, with obtuse divisions, bordered by a much more conspicuous white edging.

With nearly the same general range in Europe and Asia as the *annual S.*, it



Fig. 830.

is everywhere more local. In Britain, it appears to be confined to eastern England. *Fl. all summer.*

LX. GOOSEFOOT FAMILY. CHENOPODIACEÆ.

Herbs or undershrubs, often succulent, sometimes leafless, more usually with alternate or rarely opposite leaves, and no stipules; the small, herbaceous flowers usually in sessile clusters, either in axillary or terminal spikes or panicles, and often unisexual. Perianth single, calyx-like, deeply divided into 5, or in some flowers fewer segments. Stamens 5, opposite the perianth-segments, rarely fewer. Ovary free, with a single ovule. Styles 2 or 3, either free or united at the base. Fruit consisting of a single seed, enveloped in a very thin or sometimes succulent pericarp, and enclosed in the persistent perianth, which is sometimes enlarged or altered in form. Seed usually orbicular and flattened; the embryo curved or spirally twisted, with or without albumen.

The Order is spread over the greater part of the world, and is rather numerous in species, especially in maritime situations, or within the influence of a saline soil or atmosphere, where they sometimes, in combination with *Artemisias*, give a general grey aspect to the country. They are not easily confounded with any other British Order, but approach very near to the *Amaranth* family, which is chiefly distinguished by the presence of 2 or 3 small bracts under each flower, and by the tendency of the perianth to become scarious or coloured.

Stem succulent and jointed, without leaves. Stamens 1 or 2. 1. SALICORN.
Stem leafy, not jointed. Stamens 5.

Leaves narrow, semi-cylindrical (as thick as broad).

Leaves rather succulent and linear, not prickly. Fruiting perianth not altered. 2. SUEDEA.

Leaves prickly. Fruiting perianth encircled by a scarious wing 3. SALTWORT.

Leaves flat.

Perianth mostly 5-cleft and regular, even when in fruit.

Fruiting perianth succulent, enlarged, with prominent ribs or protuberances 5. BEET.

Fruiting perianth scarcely enlarged, herbaceous . . . 4. GOOSEFOOT.

Perianth of the male flowers 5-cleft and regular. Fruiting perianth (from female flowers) flat, consisting of 2 much enlarged segments 6. ORACHE.

The *Spinage* of our gardens (*Spinacia oleracea*), probably from western Asia, forms a genus closely allied to *Orache*, but with a differently-shaped fruiting perianth, and 4 styles. One or two species of *Amaranth*, belonging to the above-mentioned *Amaranth* family, have occasionally appeared amongst garden weeds in the neighbourhood of London, but do not appear to have anywhere established themselves in Britain. The same *Amaranth* family includes the *Love-lies-bleeding* and *Prince's-feather* (both species of *Amarantus*), the *globe Amaranth* (a species of *Gomphrena*), the *Cock's-comb* (*Celosia*), etc., of our gardens.

I. SALICORN. SALICORNIA.

Succulent, jointed herbs, sometimes hard and woody at the base, without leaves. Flowers immersed in the upper articles (or internodes), forming terminal, succulent, cylindrical spikes, each article having 6 flowers, 3 in a triangle on each side. Perianth succulent, flat, and nearly closed at the top; the stamens (usually 2 or only 1) protruding through the minutely 3- or 4-toothed orifice. Style included in the perianth, divided into 2 or 3 stigmas. Nut enclosed in the unchanged, succulent perianth. Seed ovoid, without albumen. Radicle bent back over the cotyledons.

A genus of very few species, ranging over the salt-marshes of all parts of the world.

1. Common Salicorn. *Salicornia herbacea*, Linn. (Fig. 831.)

(*S. annua*, Eng. Bot. t. 415, *S. radicans*, t. 1691, *S. fruticosa*, t. 2467, and *S. procumbens*, t. 2475. *Glasswort*.)

In its simplest form this is a glabrous, bright green, succulent, erect annual, scarcely 6 inches high, with few erect branches, each one terminated by a spike of $\frac{1}{2}$ to 1 inch long. When luxuriant, after the first flowering, branches shoot out from every joint or node as well as from the spike itself; the lower ones become hard, and often procumbent, and rooting at the nodes, and the whole plant will extend to a foot or more; and in favourable situations a few plants will outlive the winter, so as to have the appearance of undershrubs, but probably do not last beyond the second year.

In salt-marshes and muddy seashores,



Fig. 831.

throughout Europe and central and Russian Asia, except the extreme north, as well as in many other parts of the world. Abundant on the British coasts. *Fl. summer and autumn.*

II. **SUÆDA.** SUÆDA.

Herbs or undershrubs, with rather small, linear, semi-cylindrical, succulent leaves. Flowers and fruit of *Goosefoot*, except that the embryo of the seed is coiled into a flat spire, with little or no albumen.

A genus of very few species, ranging over the seacoasts of most parts of the globe, readily distinguished amongst British *Chenopodiaceæ* by the foliage as well as by the seed.

Stem shrubby at the base. Styles 3 1. *Shrubby S.*

Stem annual, much branched, or diffuse. Styles 2 2. *Herbaceous S.*

1. **Shrubby Suæda.** *Suæda fruticosa*, Forsk. (Fig. 832.)

(*Salsola*, Eng. Bot. t. 635.)

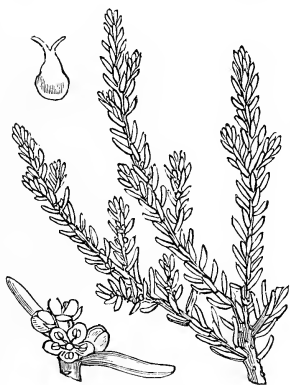


Fig. 832.

A branching perennial, more or less shrubby at the base, sometimes erect, and 1 to 2 feet high, sometimes low and spreading. Leaves numerous, linear but thick, nearly cylindrical, and succulent, 3 to 5 or rarely 6 lines long, of a pale green. Flowers small, and solitary or 2 or 3 together, closely sessile in the axils of the leaves. Styles 3, rather longer than the perianth.

In maritime sands, and salt-marshes, all round the Mediterranean, in central Asia, and up the western coasts of Europe to Holland, occurring also here and there in America. In Britain, very local, and chiefly on the eastern and some parts of the southern coasts of England. *Fl. autumn.*

2. **Herbaceous Suæda.** *Suæda maritima*, Dumort.

(Fig. 833.)

(*Chenopodium*, Eng. Bot. t. 633.)

A low, much branched annual, or sometimes biennial, of a green or

reddish colour, seldom a foot high, and often not above 2 or 3 inches. Leaves linear and succulent as in the *shrubby S.*, but usually longer and sometimes more pointed; the lower ones often an inch long, the upper ones 3 to 6 lines. Flowers small, green, and sessile, solitary or 2 or 3 together in the axils of the leaves. Styles usually 2 only.

In salt-marshes and maritime sands, in Europe and central Asia, extending northward to the shores of Scandinavia and the Baltic. Common all round the British Isles. *Fl. summer and autumn.*



Fig. 833.

III. SALTWORT. *SALSOLA*.

Herbs, with semi-cylindrical, succulent or prickly leaves. Perianth regular, 5-cleft, and enclosing the fruit when ripe, as in *Goosefoot* and *Suæda*; but the segments have then a small appendage at the top, forming a horizontal, scarious wing round the perianth. Stamens 5. Styles 2 or 3, often combined at the base, as in *Goosefoot*. Embryo coiled into a spire, with little or no albumen, as in *Suæda*.

The genus comprises a considerable number of maritime species, chiefly from the Mediterranean and western Asia.

1. Prickly Saltwort. *Salsola Kali*, Linn. (Fig. 834.)

(Eng. Bot. t. 634.)

A procumbent, glabrous annual, with a hard, much branched stem, 6 inches to near a foot long. Leaves all ending in a stout prickly, the lowest semi-cylindrical, linear, slightly enlarged at the base; the uppermost shorter and broader, nearly triangular. Flowers sessile in the upper axils. The appendage of the perianth spreads horizontally over the fruit, but usually shorter than the surrounding floral leaves or bracts.

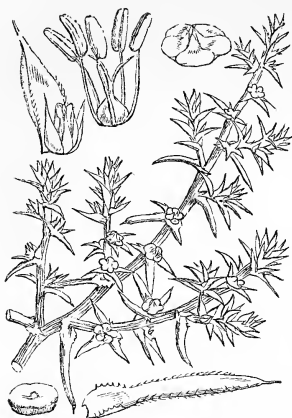


Fig. 834.

In maritime sands, and salt-marshes, in Europe and western Asia, extending northwards to Scandinavia and the Baltic. Frequent on the coasts of England and Ireland, and in Scotland up to Argyle and Aberdeen. *Fl. summer and autumn.*

IV. GOOSEFOOT. CHENOPODIUM.

Herbs, either glabrous or covered with a mealy dust; the leaves flat and alternate; the flowers small and green, in little sessile clusters, collected into spikes in the axils of the upper leaves, or forming large terminal panicles. Perianth of 5 (rarely fewer in a few flowers) equal segments, which enclose the ripe fruit without appendages or alteration, excepting a slight enlargement or thickening. Stamens 5 (rarely fewer). Styles 2 or 3, often connected at the base. Embryo of the seed curved or forming a ring round the albumen.

The species are rather numerous, widely distributed over the globe, with fewer strictly maritime ones than in most other genera of the Order. When young they much resemble the *Oraches*, but as the flowering advances they can be always known by the want of the peculiar fruiting perianths of that genus.

Perennial, with a thick, fleshy root, and broadly triangular, dark green leaves

9. *Perennial G.*

Annuals. Leaves green or grey.

Leaves all quite entire. Stems procumbent.

Plant mealy and whitish, with a nauseous smell when rubbed

1. *Stinking G.*

Plant green and scentless

2. *Many-seeded G.*

Leaves, at least the lower ones, sinuate, or toothed, or lobed, or angular.

Leaves obtusely toothed or sinuate. Plant more or less mealy white.

- Plant usually erect. Upper leaves narrow and entire, whitish on both sides 3. *White G.*
- Plant procumbent. Leaves all sinuate, green above, white underneath 4. *Glaucous G.*
- Lower leaves broad, irregularly and coarsely toothed or lobed. Plant green (except sometimes the nettle-leaved G.).*
- Lower leaves broadly cordate or truncate at the base. Clusters of flowers chiefly in a loose, terminal, leafless panicle 8. *Maple-leaved G.*
- Lower-leaves wedge-shaped, or narrowed at the base. Clusters of flowers in axillary spikes, or in a short, terminal, leafy panicle.
- Axillary spikes erect, simple or but little branched.
- Seeds horizontal 6. *Upright G.*
- Seeds vertical 5. *Red G.*
- Axillary spikes forked into spreading cymes . . 7. *Nettle-leaved G.*

1. Stinking Goosefoot. *Chenopodium Vulvaria*, Linn.
(Fig. 835.)

(*C. olidum*, Eng. Bot. t. 1034.)

A procumbent or spreading, much-branched annual, seldom a foot long, covered with a granular mealiness, and remarkable for a strong, stale-fish smell when rubbed. Leaves small, ovate, all quite entire, on rather long stalks. Clusters of flowers small, in short axillary and terminal racemes, often branched, but not much exceeding the leaves in length.

Under walls, in waste and rubbishy places, in Europe and western Asia, extending northwards into southern Scandinavia. Occurs in various parts of England and southern Scotland, more rare in the west, and in Ireland. *Fl. summer and autumn.*



Fig. 835.

2. Many-seeded Goosefoot. *Chenopodium polyspermum*, Linn. (Fig. 836.)

(Eng. Bot. t. 1480, and *C. acutifolium*, t. 1481.)

Usually a procumbent or spreading, much-branched annual, with all



Fig. 836.

the leaves quite entire, as in the *stinking G.*, but without the granular mealliness or the nauseous smell of that species. It is also sometimes erect, a foot high, with numerous branches, ascending from the base. Leaves usually rather thin, green, ovate, $\frac{1}{2}$ to 2 inches long. Clusters of flowers small, in short axillary spikes; the upper ones forming an irregular terminal spike or narrow panicle. Calyx-segments thin, green, not covering the seed as in the *white G.*

In cultivated and waste places, dispersed all over Europe and Russian Asia, except the extreme north. In Britain, limited to southern and central England. *Fl. summer and autumn.*

3. White Goosefoot. *Chenopodium album*, Linn.

(Fig. 837.)

(Eng. Bot. t. 1723 and *C. ficifolium*, t. 1724.)



Fig. 837.

A tough annual, usually erect, 1 to 2 feet high, of a pale green, or more or less mealy-white, especially the flowers and the under side of the leaves. Leaves stalked, the lower ones ovate or rhomboidal, more or less sinuately toothed or angular, the upper ones usually narrow and entire. Clusters of flowers in short axillary spikes, either dense or interrupted, simple or slightly branched; the upper ones forming a long panicle, leafy at the base. Seeds entirely enclosed in the perianth, and all horizontal.

In cultivated and waste places, throughout Europe and central and Russian Asia to the Arctic regions, and carried out with cultivation to nearly all parts of the globe. The commonest species in Britain. *Fl. all summer and autumn.* Specimens may sometimes occur with al-

most all the leaves entire, but they have not the smell of the *stinking G.*,

are usually more erect, and if perfect, the lower leaves at least will always show a tendency to the angular or sinuate form.

4. **Glaucous Goosefoot.** *Chenopodium glaucum*, Linn.

(Fig. 838.)

(Eng. Bot. t. 1454.)

Sometimes a low, procumbent plant, like the *stinking G.*, sometimes more erect, but not so much as the *white G.*, and more branched. Leaves narrow-ovate or oblong, sinuately toothed, but more regularly so than in any other species, green above, mealy-white underneath. Clusters of flowers small, mostly in axillary, nearly simple spikes. Perianth green or slightly mealy, almost closing over the seed, which is usually erect, as in the *red G.*, horizontal only in a few flowers.

In cultivated and waste places, dispersed over Europe and central and Russian Asia, except the extreme north. Occurs occasionally in various parts of England, but not yet detected in Ireland or Scotland. *Fl. summer and autumn.*



Fig. 838.

5. **Red Goosefoot.** *Chenopodium rubrum*, Linn.

(Fig. 839.)

(Eng. Bot. t. 1721, and *C. botryoides*, t. 2247.)

Very near the *upright G.*, of which it has the foliage and inflorescence, and only differs in that most of the flowers have only 2 or 3 segments to the perianth, with the seed erect, not horizontal, and usually much smaller. The whole plant is more apt to turn red, especially near the sea.



Fig. 839.

Under walls, on roadsides, and in waste places, especially near the sea, throughout Europe and Russian Asia, except the extreme north. Dispersed over England, Ireland, and southern Scotland. *Fl. summer and autumn.*

6. Upright Goosefoot. *Chenopodium urbicum*, Linn.
(Fig. 840.)

(Eng. Bot. t. 717.)



Fig. 840.

An erect, rather stout, slightly branched annual, 1 to 2 feet high, usually green, without the mealliness of the *white G.* Lower leaves on long stalks, broadly ovate, triangular or rhomboidal, almost always narrowed or wedge-shaped at the base, coarsely and irregularly toothed or lobed, 2 or 3 inches long, the upper ones narrower and more pointed. Clusters of flowers small and numerous, in crowded axillary spikes, usually erect and slightly branched, more slender than in the *white G.* Perianth small and green, not completely covering the seed, which is always horizontal.

Under walls, on roadsides, and in waste places, throughout Europe and central and Russian Asia, except the extreme north. In Britain, chiefly near habitations, in England, Ireland, and southern Scotland. *Fl. summer and autumn.*

7. Nettle-leaved Goosefoot. *Chenopodium murale*, Linn.
(Fig. 841.)

(Eng. Bot. t. 1722.)

An erect or decumbent and much-branched annual, a foot high or rather more, either green like the *upright G.* or with a slight, whitish meal. Leaves broadly ovate and coarsely toothed, as in the *upright G.*, and the inflorescence is also chiefly axillary, but the spikes are much branched, forming spreading cymes. Calyx usually slightly mealy, almost closing over the seeds, which are all horizontal.

Under walls, on roadsides, and in waste places, in temperate Europe, as far northward as southern Sweden, all across central and Russian Asia, and in some other countries. Not uncommon near habitations, in some parts of England and Ireland, but does not extend into Scotland. *Fl. summer and autumn.*



Fig. 841.

8. Maple-leaved Goosefoot. *Chenopodium hybridum*,
(Fig. 842.)

(Eng. Bot. t. 1919.)

An erect, branching annual, 1 to 2 or 3 feet high, green and glabrous. Leaves like those of *Spinage*, rather thick, stalked, ovate, coarsely toothed, sinuate or with a few broad lobes, the larger ones 2 or 3 inches long and broadly cordate at the base, the upper ones narrower. Clusters of flowers in forked cymes, forming a loose terminal panicle, scarcely leafy at the base. Perianth green, leaving a considerable part of the seed exposed.

In cultivated and waste places, dispersed over Europe, central and Russian Asia, and North America. Scarce in Britain, and probably confined to England, where it occurs occasionally as a weed of cultivation. *Fl. summer and autumn.*



Fig. 842.

9. Perennial Goosefoot. *Chenopodium Bonus-Henricus*,
Linn. (Fig. 843.)

(Eng. Bot. t. 1033. *Good King Henry*.)



Fig. 843.

Distinguished from all the preceding by its perennial stock, with a thick, fleshy root, like that of a *Dock*. Stems about a foot high, scarcely branched. Leaves like those of *Spinage*, stalked, broadly triangular, often above 3 inches long, sinuate or slightly toothed, rather thick, and of a dark green; the upper ones smaller, and nearly sessile. Flowers numerous, in clustered spikes, forming a narrow terminal panicle, slightly leafy at the base. Seeds vertical, not completely concealed by the perianth.

On waste ground, near villages and sheepfolds, in the mountain districts of Europe and Russian Asia, except the extreme north. In Britain, chiefly on roadsides, near villages and dwellings, in England, Ireland, and southern Scot-

land, but in many places introduced only, having been formerly much cultivated as a potherb. *Fl. spring and all summer.*

V. **BEET.** BETA.

Inflorescence and flowers of *Goosefoot*, except that each flower has 3 small bracts at its base, and that the ovary and seed are immersed in the succulent base of the perianth, which thickens and hardens as it ripens, becoming angular, and often toothed or prickly.

The species are very few, extending along the coasts of Europe, western Asia, and Africa.

1. Common Beet. *Beta maritima*, Linn. (Fig. 844.)

(Eng. Bot. t. 285.)

The wild *Beet* has a short, hard stock of a few years' duration, with erect or spreading branched stems about 2 feet high. Lower leaves large, broad, rather thick, and green, the upper ones small and narrow. Flowers green like those of a *Goosefoot*, single or clustered, in long,

loose terminal spikes, often branching into a leafy panicle. The ripe perianth forms a hard, angular, often prickly mass, enclosing a single horizontal seed like that of a *Goosefoot*.

On rocks, and in muddy sands by the sea-shore, in Europe, western Asia, and northern Africa, extending northwards to the Baltic. Not uncommon on the British coasts. *Fl. summer and autumn*. The *white* and *red Beets* or *Beetroot* of our gardeners, and the *Mangel Wurzel* (*Root of Scarcity*) of our agriculturists, are cultivated varieties of this species.



Fig. 844.

VI. **ORACHE.** ATRIPLEX.

Herbs or undershrubs, often covered with a grey or white, scaly meal; the leaves flat and alternate, or the lower ones rarely opposite. Flowers small and numerous, clustered in axillary spikes or terminal panicles as in *Goosefoot*, but always of two kinds; in some, which are usually males only, the perianth is regular and 5-cleft as in *Goosefoot*, with 5 stamens; in the females the perianth consists of two flat segments (or rather, bracts replacing the real perianth), either free or more or less united at the edges, enclosing the ovary. After flowering this false perianth enlarges, is often toothed at the edge, and covered with wart-like excrescences. Seed usually vertical. In some species there are also a few regular female real perianths, which ripen without enlarging, and contain a horizontal seed, as in *Goosefoot*. Embryo curved round the albumen.

A considerable genus, widely spread over the maritime or saline districts of the globe, scarcely any species besides the common one being ever found inland, or away from the saline influence.

Segments of the fruiting perianth united nearly to the top.

Leaves all entire and mealy-white.*

Perennial, or shrubby at the base. Fruiting perianth

sessile 1. *Purslane O*

Annual. Fruiting perianth distinctly stalked 2. *Stalked O.*

Segments of the fruiting perianth not united above the middle. Annuals. Leaves either toothed or hastate, or, if entire, narrow and green.

Segments of the fruiting perianth thin, and quite free.

Plant of 4 or 5 feet 3. *Garden O.*

Segments of the fruiting perianth thickish, and partially united. Plant not above 3 feet, erect or procumbent.

Floral leaves nearly sessile. Fruiting perianths mostly axillary, white and scaly 5. *Frosted O.*

Leaves almost all stalked. Fruiting perianths mostly mixed with the male flowers, green or slightly mealy 4. *Common O.*

The *shrubby O.* (*A. Halimus*), from the shores of the Mediterranean, is often cultivated in gardens, especially near the seacoast.

1. Purslane Orache. *Atriplex portulacoides*, Linn.

(Fig. 845.)

(Eng. Bot. t. 261. *Sea Purslane. Lesser Shrubby Orache.*)



Fig. 845.

A low, straggling, much branched shrub or undershrub, often shortly creeping, and rooting at the base, 1 to 1½ feet high, covered with a grey scabiness closer than in other *Oraches*. Leaves obovate or oblong, tapering at the base, or the upper ones linear, seldom above an inch long, and always entire. Flowers in short, interrupted spikes, forming a terminal panicle. Fruiting perianth small and thick, triangular or nearly orbicular; the segments united very nearly to the top, where they are more or less toothed.

On the seacoasts of Europe, western Asia, and northern Africa, extending northwards to the Baltic. Common on the shores of the greater part of England and Ireland, but rare in Scotland. *Fl. autumn.*

2. Stalked Orache. *Atriplex pedunculata*, Linn. (Fig. 846.)

(Eng. Bot. t. 232.)

Resembles the *Purslane O.* in its entire, thickish leaves, scaly-white on both sides, but is an annual only, with spreading branches, seldom a foot high; the leaves usually broader, the lower ones ovate or

obovate. Fruiting perianth always borne on a pedicel of 2 or 3 lines; the segments wedge-shaped, united to the top, where the two angles often project into little recurved points.

In the saline districts of central and south Russian Asia, on the shores of the Black Sea, the Baltic, and the North Sea, as far west as Belgium, but apparently absent from the Mediterranean and the Atlantic coasts. In Britain, only on the eastern shores of England. *Fl. summer and autumn.*



Fig. 846.

3. Garden Orache. *Atriplex hortensis*, Linn. (Fig. 847.)

(*A. nitens*, Brit. Fl.)

An erect, stout annual, attaining 4 or 5 feet in height. Leaves broadly triangular, cordate or hastate, or the upper ones narrow, green or slightly white and mealy underneath. Flowers very numerous and crowded, in a long, terminal, leafy panicle. Fruiting perianths of 2 broad, flat segments, distinct nearly from the base, 3 or 4 lines long, quite entire, thin and net-veined, closely clasping the flat vertical seed: intermixed with them are also several small, regular, 5-cleft perianths, half-closed over a horizontal seed as in the *Goosefoots*.

Of east European or west Asiatic origin, but has long been cultivated in kitchen-gardens, and was formerly much used as spinach, and has established itself as an escape from cultivation in several parts of Europe. In Britain, said to be tolerably abundant on the seacoast near Ryde, in the Isle of Wight. *Fl. end of summer,*



Fig. 847.

and autumn. The Ryde specimens are much nearer to the common garden form than to the east European wild variety often distinguished under the name of *A. nitens*.

4. Common Orache. *Atriplex patula*, Linn. (Fig. 848.)



Fig. 848.

A most variable plant in stature, in the shape of the leaf, and in the fruiting perianth. It is an annual, erect or prostrate, dark or pale green, or more or less mealy-white, but never so thickly frosted or scaly as the *frosted O.* Leaves all stalked; the lower ones usually hastate and sometimes opposite; the upper ones often narrow and entire, or coarsely toothed. Flowers clustered in rather slender spikes, forming narrow, leafy terminal panicles; the females mixed with the males, or a few in separate axillary clusters. Segments of the fruiting perianth united to about the middle, usually ovate or rhomboidal and pointed, often toothed at the edge and warted or muricate on the back, but very variable in size and shape, often of two kinds, a

larger and a smaller, on the same plant.

On the seacoasts of Europe, Asia, and Africa, extending to the Arctic regions, besides being very common inland as a weed of cultivation. Abundant in Britain. *Fl. the whole season except early spring.* The principal forms, which have been distinguished as species, although they run very much one into another, are the following:—

a. *Hastate O.* (*A. patula*, Eng. Bot. t. 936; *A. deltoidea*, Suppl. t. 2860; *A. rosea*, Suppl. t. 2880; and *A. Babingtoni*, Brit. Fl.) Erect or spreading. Lower leaves broadly triangular or hastate, often coarsely and irregularly toothed.

b. *Upright O.* (*A. erecta*, Eng. Bot. t. 2223.) Stem erect. Leaves lanceolate, the lower ones broader and hastate.

c. *Common O.* (*A. angustifolia*, Eng. Bot. t. 1774.) Stem spreading or decumbent. Leaves mostly lanceolate or the upper ones linear.

d. *Narrow O.* (*A. littoralis*, Eng. Bot. t. 708.) Stems prostrate. Leaves still narrower than in the last, often toothed.

All these varieties have maritime forms, with thicker succulent leaves, in some specimens very green and shining, in others more or less mealy-white, especially the *hastate* variety.

5. Frosted Orache. *Atriplex rosea*, Linn. (Fig. 849.)(A. *laciniata*, Eng. Bot. t. 165.)

Resembles some of the maritime varieties of the *common O.*, but is much more covered with a white scaly meal; the leafstalks are much shorter, the floral leaves almost sessile, and the female perianths are mostly clustered in the axils of the leaves, whilst the male flowers are in rather dense spikes, forming short terminal panicles. Leaves usually broadly triangular or rhomboidal, and coarsely toothed. Fruiting perianths always mealy-white, rather thick, rhomboidal or orbicular, often warted: the segments often united to above the middle, but not so high as in the *Purslane O.*

On the seacoasts, and in the saline districts of Europe, Asia, and Africa, but not extending to the Arctic regions. Not uncommon round the British Isles.



Fig. 849.

Fl. summer and autumn.

LXI. POLYGONUM FAMILY. POLYGONACEÆ.

Herbs, or, in some exotic species, shrubs, with alternate leaves, and thin, scarious stipules, forming a sheath or ring round the stem within the leafstalk. Flowers small, herbaceous or sometimes coloured, clustered in the axils of the leaves or in spikes or racemes, forming terminal panicles. Perianth of 6, 5, or fewer segments, regular and equal, or the inner ones enlarged. Stamens variable in number, never more than 8 in the British species. Ovary free, with a single ovule, but with 2, 3, or more styles or stigmas. Fruit a small, seed-like nut, enclosed in the persistent perianth. Embryo of the seed straight or curved, in a mealy albumen.

A considerable Order, dispersed over every part of the globe, from the hottest tropical plains to the extreme Arctic regions, or to the highest mountain-summits, close to the limits of perpetual snows. Some tropical species are tall, woody climbers, or erect shrubs, but the majority of the Order are herbs approaching the *Goosefoot* family

in character, and sometimes in habit, but always readily known by their sheathing stipules, even when reduced to a narrow ring or a mere line surrounding the stem. They also very seldom acquire any of the mealiness of the *Goosefoot* family.

Fruiting perianth of 6 segments, 3 inner ones often enlarged . . . 1. DOCK.

Fruiting perianth of 4 segments, 2 inner ones enlarged . . . 2. OXYRIA.

Fruiting perianth of 5 nearly equal segments . . . 3. POLYGONUM.

The *Rhubarbs* of our gardeners and druggists are species of the genus *Rheum*, belonging to the *Polygonum* family.

I. DOCK. RUMEX.

Herbs or shrubs, the British species all perennials, with a thick rootstock, and erect, furrowed, annual stems; the thin sheathing stipules never fringed on the edge, but soon becoming torn or jagged. Lower leaves stalked and often large. Flowers numerous, small, herbaceous, though often turning red, usually pedicellate, in whorl-like clusters, axillary or in terminal racemes, often branching into panicles. Perianth deeply 6-cleft; when in fruit the 3 inner segments become enlarged and close over the triangular nut. Stamens 6. Styles 3, very short, with fringed stigmas.

A considerable genus, spread over the greater part of the world, very readily distinguished from the rest of the Order, but the species vary so much in appearance that it is often very difficult to fix their real limits. They can also seldom be determined without the fruiting perianth, from which most of the characters are taken. They may be readily distributed into two distinct sections, the true *Docks* and the *Sorrels*.

Leaves never hastate at the base (though often cordate, with obtuse auricles). Flowers mostly hermaphrodite.

(DOCKS.)

Inner perianth-segments entire, or with one or two scarcely perceptible teeth.

Segments broadly ovate, more or less cordate. Panicle narrow and crowded when in fruit.

No tubercle on any of the perianth-segments . . . 1. *Grainless D.*

A tubercle on one at least of the perianth-segments . . . 2. *Curled D.*

Segments ovate, not cordate.

Tall water-plant. Lower leaves above a foot long.

Panicle erect. A tubercle on all three perianth-segments . . . 4. *Water D.*

Plant seldom above 3 feet. Lower leaves not a foot.

Panicle very spreading. Perianths small.

A tubercle on all three perianth-segments . . . 5. *Clustered D.*

A tubercle on one segment only . . . 6. *Red-veined D.*

Inner perianth-segments toothed on the edge, one at least of the teeth ending in a fine point.

Panicle erect. Pedicels longer than the perianth . . . 3. *Broad D.*

Panicle very spreading. Pedicels shorter than the fruiting perianth.

Leaves chiefly radical. Pedicels thickened. Teeth of the perianth-segments stiff and short 7. *Fiddle D.*

Panicle leafy. Perianths densely clustered with long fine teeth to the segments 8. *Golden D.*

Leaves, at least the lower ones, hastate (with acute auricles).

Flowers mostly unisexual. (SORRELS.)

Leaves oblong or broadly lanceolate. Inner segments of the fruiting perianth enlarged and orbicular 9. *Sorrel D.*

Leaves narrow-lanceolate or linear. Inner segments of the fruiting perianth not enlarged 10. *Sheep-sorrel D.*

Besides the above, the *alpine D.* (*R. alpinus*, Eng. Bot. Suppl. t. 2694), from the mountains of continental Europe, formerly cultivated for its root, a very broad-leaved species of *true Dock*, with entire, grainless perianth-segments, and the *French sorrel D.* (*R. scutatus*), also a common plant in Continental mountains, sometimes cultivated as a Sorrel, have both been met with occasionally in Scotland or northern England, near the gardens from which they had escaped, but neither of them appears to be really established in Britain.

1. Grainless Dock. *Rumex aquaticus*, Linn. (Fig. 850.) (Eng. Bot. Suppl. t. 2698.)

Closely resembles the larger and denser-flowered forms of the *curled D.*, of which it may be a luxuriant variety. The leaves are usually not so much crisped, sometimes nearly flat, and often 9 or 10 inches long and full 3 inches broad; the panicle long and much crowded; but the chief difference is in the inner segments of the fruiting perianth, which are of the same shape, but have no tubercle, although a slight thickening of the midrib may be sometimes observed.

In rather rich and moist situations, in northern and Arctic Europe, Asia, and America, and in the mountains of central Europe. In Britain, chiefly in Scotland and the north of England.

Fl. summer.



Fig. 850.

2. Curled Dock. *Rumex crispus*, Linn. (Fig. 851.)

(Eng. Bot. t. 1998.)



Fig. 851.

Stem 2 to 3 feet high, with but few branches, usually short, and seldom spreading. Radical leaves long and narrow, usually much waved or crisped at the edges, and about 6 to 8 inches long, but varying much in size; the upper ones smaller and narrower, gradually passing into mere bracts. Whorls of flowers numerous, and when in fruit much crowded in a long narrow panicle, although the slender pedicels are really longer than the perianths. Inner segments of the fruiting perianth broadly ovate, more or less cordate, one of them bearing on the midrib an ovoid or oblong, coloured tubercle or *grain*, whilst the others have the midrib only a little thickened, except in the southern varieties, where all three have often a tubercle.

On roadsides, in ditches, pastures, and waste places, throughout Europe and Russian Asia, except the extreme north, and (probably naturalized) in many other parts of the globe. Abundant in Britain. *Fl. summer*. Specimens are occasionally found with the leaves rather broader and the perianth-segments very slightly toothed, showing an approach to the *broad D.* These are by some believed to be hybrids between the two species, by others considered as a distinct species (*R. pratensis*, Eng. Bot. Suppl. t. 2757, a specimen very near the *broad D.*).

3. Broad Dock. *Rumex obtusifolius*, Linn. (Fig. 852.)

(Eng. Bot. t. 1999.)

Stem 2 or 3 feet high, and but slightly branched, as in the *curled D.*, which it much resembles. It differs however in the broader leaves, the radical ones often 8 or 9 inches by 3 or 4, rounded at the top, and cordate at the base, the upper ones narrower and more pointed; in the looser and more distinct whorls of flowers, and the less crowded panicles, although not near so spreading as in the *red-veined D.*; and especially in the inner segments of the perianth, which, although often

broadly ovate, are never cordate, and are bordered below the middle by a few small teeth, usually ending in a fine point. As in the *curled D.*, one or all three segments have a small tubercle at the base.

In the same situations and at least as widely spread and as common as the *curled D.*, with which and the *red-veined D.* it is usually mixed. Very abundant in Britain. *Fl. summer.*



Fig. 852.

4. Water Dock. *Rumex Hydrolapathum*, Huds. (Fig. 853.)

(*R. aquaticus*, Eng. Bot. t. 2104.)

Stem 3 to 5 feet high, slightly branched. Leaves long, lanceolate or oblong, usually pointed, and flat or only very minutely crisped at the edges; the lower ones often 1 to 2 feet long, narrowed at the base into a long erect footstalk. Panicle long and rather dense, leafy at the base, the branches scarcely spreading. Inner perianth-segments ovate, not so broad as in the *curled D.*, and never cordate, entire or scarcely toothed, with a large oblong tubercle on all three, or rarely wanting on one of them.

On the edges of streams and pools, and in watery ditches, in central and northern Europe and Russian Asia, but not an Arctic plant. Generally dispersed over England, Ireland, and southern Scotland. *Fl. summer.*



Fig. 853.

5. Clustered Dock. *Rumex conglomeratus*, Murr.
(Fig. 854.)

(*R. acutus*, Eng. Bot. t. 724.)



Fig. 854.

Resembles in many respects the *red-veined D.*, of which it may be a tall, luxuriant variety, showing some approach to the *water D.* Stem 2 to 3 feet high. Leaves often pointed, as in the *water D.*, but more waved on the edges, and the lower ones often rounded or even cordate at the base. Panicle with spreading branches and distinct whorls, as in the *red-veined D.*, but larger. Inner perianth-segments narrow-ovate, rather larger than in the *red-veined D.*, and usually all three equal, with an oblong tubercle upon each.

In meadows, pastures, and waste places, usually in richer and wetter situations than the *red-veined D.*, widely spread over Europe and central and Russian Asia, except the extreme north, and apparently naturalized in many other parts of the world. Generally distributed over Britain, but not always readily distinguished from the *red-veined D.* *Fl. summer.*

6. Red-veined Dock. *Rumex sanguineus*, Linn.
(Fig. 855.)

(Eng. Bot. t. 1533.)

Stem not so tall as in most of the preceding species, seldom above 2 feet, and more branched. Radical leaves oblong or lanceolate, sometimes cordate at the base, waved on the edges, and sometimes narrowed in the middle as in the *fiddle D.* Panicle leafy at the base, with stiff, though slender, very spreading branches; the whorls of flowers all distinct. Pedicels shorter than in the foregoing, but longer than in the following species. Fruiting perianths small; the inner segments narrow, and entire or scarcely toothed, one about $1\frac{1}{2}$ lines long, with a large tubercle, the two others usually smaller, without any or only a very small tubercle.

On roadsides, in ditches, pastures, and waste places, throughout Europe and Russian Asia, except the extreme north, usually accompanying the *curled D.* and the *broad D.* Abundant in Britain. *Fl. summer.* It varies considerably, and often assumes a red tint, especially on the leafstalks and panicle.



Fig. 855.

7. Fiddle Dock. *Rumex pulcher*, Linn. (Fig. 856.)

(Eng. Bot. t. 1576.)

A rather low species, often not a foot high, and seldom 2 feet, with stiff, very spreading branches. Leaves chiefly radical, oblong, cordate at the base, and often narrowed in the middle. Whorls of flowers all quite distinct, forming very compact clusters; the fruiting pedicels thickened and recurved, shorter than the perianth. Inner segments toothed, as in the *broad D.*, but narrow-ovate, all 3, or only 1 or 2 of them bearing a tubercle.

On roadsides and in waste places, in central and southern Europe and western Asia, very common in the Mediterranean region, but not extending into northern Germany. In Britain, chiefly in southern England, but occurs as far north as Nottingham and Stafford. *Fl. summer.*



Fig. 856.

8. Golden Dock. *Rumex maritimus*, Linn. (Fig. 857.)
(Eng. Bot. t. 725.)



Fig. 857.

Stem 1 to $1\frac{1}{2}$ feet high, often much branched. Leaves narrow-lanceolate or linear. Flowers small and very numerous, densely crowded in globular axillary whorls, even the upper floral leaves being much longer than the flowers. Pedicels slender but short. Inner segments of the fruiting perianth lanceolate or triangular, fringed with rather long fine teeth, and with a narrow-oblong tubercle upon each segment. The whole plant, and especially the perianth, often assumes a yellowish hue.

In marshes, chiefly near the sea, in temperate Europe and Russian Asia, extending northwards into Scandinavia. In Britain, apparently confined to England and Ireland. *Fl. summer*. A more luxuriant variety, with the whorls more distant, and rather shorter points to the teeth of the perianth-segments, has been distinguished as a species under the name of *R. palustris* (Eng. Bot. t. 1932, not good).

9. Sorrel Dock. *Rumex Acetosa*, Linn. (Fig. 858.)
(Eng. Bot. t. 127. *Sorrel*.)



Fig. 858.

Stems scarcely branched, 1 to 2 feet high. Leaves chiefly radical, oblong, 3 to 5 inches long, sagittate at the base with broad pointed auricles, of a bright green, and very acid; the stem-leaves few, on shorter stalks. Flowers dioecious or sometimes monœcious, in long, terminal, leafless panicles, usually turning red. Inner segments of the fruiting perianth enlarged, orbicular, thin and almost petal-like, quite entire, without any tubercle, but each with a minute scale-like appendage at the base, which, as well as the small outer segments, is turned back on the pedicel.

In meadows and moist pastures, in Europe, central and Russian Asia, and northern America, from the Mediter-

reanean to the Arctic Circle, ascending high into mountain-ranges, and reappearing in the southern hemisphere. Extends all over Britain, and has long been in cultivation. *Fl. summer.*

10. Sheep-sorrel Dock. *Rumex Acetosella*, Linn.

(Fig. 859.)

(Eng. Bot. t. 1674. *Sheep-sorrel.*)

A slender plant, from 3 or 4 inches to nearly a foot high, acid like the *Sorrel D.*, and often turning red. Leaves all narrow-lanceolate and linear, and some at least of every plant sagittate, the lobes of the base usually spreading and often divided. Flowers small, diœcious, in slender terminal panicles. Segments of the perianth small, broadly ovate or orbicular, entire, and thin; the inner ones closing over the nut as in the other species, but scarcely enlarged; the outer ones erect, not reflexed as in the *Sorrel D.*

In pastures, especially in dry open places, over the greater part of the globe without the tropics, penetrating far into the Arctic regions, and ascending high upon alpine summits. Abundant in Britain. *Fl. from spring till autumn.*



Fig. 859.

II. **OXYRIA.** OXYRIA.

A single species, with the habit of a small *Dock* of the *Sorrel* group, separated from that genus because the perianth has only 2 inner and 2 outer segments of the perianth, and the ovary has only 2 stigmas.

1. **Kidney Oxyria.** *Oxyria reniformis*, Campd. (Fig. 860.)

(*Rumex digynus*, Eng. Bot. t. 910.)

A glabrous perennial, seldom above 6 inches high, of an acid flavour. Leaves chiefly radical, cordate-orbicular or kidney-shaped, usually less than half an inch, but sometimes an inch broad. Stem slender and



Fig. 860.

almost leafless, terminating in a simple or slightly branched raceme. Flowers small, in clusters of 2 or 3, on slender pedicels; the inner segments of the perianth slightly enlarged, but shorter than the nut. Stamens 6. Nut flat, orbicular, about 2 lines in diameter, including a scarious wing, which surrounds it, and is either entire or notched at the top and at the base.

A high alpine plant, in all the great mountain-ranges of Europe and central and Russian Asia, descending to a lower level in the north, and extending far into the Arctic regions. Frequent in the mountains of Scotland, northern England, North Wales, and northern Ireland. *Fl. summer.*

III. **POLYGONUM.** POLYGONUM.

Herbs, varying much in habit, but not so stiffly erect as the *Docks*, and sometimes prostrate, floating, or twining; the scarious stipules usually sheathing the stem and often fringed at the edge; the leaves alternate. Flowers small, pale-green or red, clustered or rarely solitary in the axils of the upper leaves, or in terminal heads, spikes, or panicles. Perianth of 5 (rarely fewer) segments, either all equal or 2 or 3 outer ones enlarged. Stamens 8 or sometimes fewer. Styles 3 or 2, sometimes united at the base, the stigmas entire. Nut triangular or flattened, enclosed in or surrounded by the persistent perianth.

A large genus, widely spread over every part of the globe.

Stems much branched, wiry, often prostrate. Flowers axillary.

Annual. Nuts scarcely above a line long, opaque, dotted, or wrinkled 1. *Knotweed P.*

Perennial. Nuts about 2 lines long, very smooth and shining 2. *Sea P.*

Stems twining. Flowers in loose racemes.

Fruiting perianth triangular, scarcely winged . . . 3. *Climbing P.*

Fruiting perianth with 3 white, scarious wings . . . 4. *Copse P.*

Stems usually ascending or erect, or floating. Flowers in terminal spikes.

Rootstock perennial. Spikes solitary or rarely two.

Leaves oblong-linear. Spikes slender and linear . 5. *Viviparous P.*

Leaves ovate or oblong-lanceolate. Spike dense, oblong or cylindrical.

Styles 3. Leaves chiefly radical. Stem-leaves few and small 6. *Bistort P.*

Styles 2. Stem floating or ascending, with large, oblong, stalked leaves 7. *Amphibious P.*

Annuals. Stems branched with several spikes.

Spikes dense, seldom above an inch long.

Pedicels and perianths quite smooth. Stipules usually fringed 8. *Persicaria P.*

Pedicels and perianth rough with glands. Stipules usually entire 9. *Pale P.*

Spikes long and slender; the clusters of flowers, at least the lower ones, distinct.

Perianth covered with raised dots. Taste biting 10. *Waterpepper P.*

Perianth without raised dots. Taste not biting . 11. *Slender P.*

The *tall Persicaria* of our gardens is an east Asiatic *Polygonum* (*P. orientale*), and several other Asiatic species have been recently introduced into our flower-gardens. The *Buckwheat* of agriculturists, occasionally found on the margins of fields where it had been cultivated, is also an Asiatic plant, included by some in *Polygonum* (*P. Fagopyrum*, Eng. Bot. t. 1044), by others separated into a distinct genus under the name of *Fagopyrum*.

1. Knotweed Polygonum. *Polygonum aviculare*, Linn.

(Fig. 861.)

(Eng. Bot. t. 1252. *Knotgrass*.)

A much branched, wiry annual, prostrate when in the open ground, erect when drawn up amongst corn or grass, often a foot or two long. Stipules white and scarious, becoming ragged at the edges. Leaves narrow-oblong, small, very rarely attaining an inch in length. Flowers small, shortly stalked in clusters of 2 to 5 in the axils of most of the leaves. Styles 3. Fruiting perianths but little more than a line long; the segments white on the edge, green in the centre. Nuts triangular, seldom exceeding the perianth, not shining, and, when seen through a strong glass, minutely granulated or wrinkled.

In cultivated and waste places, almost all over the globe, from the tropics to the Arctic regions. Abundant in Britain. *Fl. almost the whole season.* It varies much in its branches, sometimes very long and



Fig. 861.

slender, with very few distant leaves, sometimes short and densely matted, with the small leaves much crowded. A maritime variety, distinguished under the name of *P. littorale*, with rather thicker leaves and larger flowers and nuts, has been sometimes confounded with young or luxuriant specimens of the sea *P.*, but has not the shining nuts of that species.

2. Sea Polygonum. *Polygonum maritimum*, Linn. (Fig. 862.)

(Eng. Bot. Suppl. t. 2804.)



Fig. 862.

When flowering the first year of its growth, or when luxuriant, this species is distinguished from the *Knotweed P.* by its thicker stems, larger and thicker, more glaucous leaves, larger scarious stipules, brown and much veined at the base, larger flowers, and especially by the nuts, often 2 lines long, projecting beyond the perianth, and very smooth and shining. Older specimens, grown in dryer sands, have a woody, perennial stock, with short, thick branches, completely covered by the stipules, the internodes being all very short.

In maritime sands, on most of the sea-coasts of the northern hemisphere, and here and there also in the south. Common on the British coasts. *Fl. end of summer, and autumn.* It is considered

by American botanists as a variety of the *Knotweed P.* The *P. Roberti* or *P. Raii* (Eng. Bot. Suppl. t. 2805) is rather a young or a luxuriant state of this plant than a distinct variety, although those names are sometimes given to the maritime variety of the *Knotweed P.*

3. Climbing Polygonum. *Polygonum Convolvulus*, Linn. (Fig. 863.)

(Eng. Bot. t. 941. *Climbing Buckwheat. Black Bindweed.*)

A glabrous annual, with the twining stem of a *Convolvulus*. Stipules short. Leaves stalked, heart-shaped or broadly sagittate, and pointed. Flowers in little loose clusters; the lower ones axillary, the upper ones forming loose, irregular terminal racemes. Styles 3. Fruiting perianth not 2 lines long; the 3 outer segments closely surrounding the triangular nut, and sometimes sharply keeled on the midrib, but not winged.

In cultivated and waste places, throughout Europe, in central and Russian Asia, and North America, to the Arctic regions. Frequent in Britain. *Fl. summer and autumn.*



Fig. 863.

4. Copse Polygonum. *Polygonum dumetorum*, Linn. (Fig. 864.)

(Eng. Bot. Suppl. t. 2811.)

Stem, foliage, and inflorescence of the *climbing P.*, of which it may be a mere variety; but it is more luxuriant, and the 3 angles of the fruiting perianth are more or less expanded into a white, scarious wing, which is often decurrent on the pedicel, the whole perianth being often 3 lines long. The nut is also usually more shining.

In hedges, open woods, or rich, cultivated places, in Europe, Russian Asia, and North America, but not so common, nor extending so far northward, as the *climbing P.* In Britain, chiefly in the southern counties of England. *Fl. end of summer, and autumn.*



Fig. 864.

5. **Viviparous Polygonum.** *Polygonum viviparum*, Linn.
(Fig. 865.)

(Eng. Bot. t. 669.)



Fig. 865.

Stock perennial and tuberous, with simple, erect, slender stems, 4 to 6 or rarely 8 inches high. Radical leaves on long stalks, narrow-oblong or linear; stem-leaves few, nearly sessile or clasping the stem. Spike solitary and terminal, slender, $1\frac{1}{2}$ to 3 inches long. Flowers, when perfect, pale flesh-coloured, and small, with 3 styles, but the lower ones, and sometimes all, are converted into little red bulbs, by which the plant propagates.

In alpine pastures, often at great elevations, in all the great mountain-ranges of Europe and Asia, descending to lower levels in the north, and penetrating far into the Arctic regions. Frequent in the Highlands of Scotland, and occurs also in northern England and North Wales, and on Ben Bulbin in Ireland. *Fl. summer.*

6. **Bistort Polygonum.** *Polygonum Bistorta*, Linn. (Fig. 866.)
(Eng. Bot. t. 509. *Bistort.* *Snakeweed.*)



Fig. 866.

Perennial rootstock thick, and often spreading considerably. Radical leaves in broad patches, on long stalks, ovate-lanceolate or cordate, often 3 to 6 inches long. Stems simple and erect, 1 to 2 feet high, with a few nearly sessile leaves, and terminating in a single, dense, oblong, or cylindrical flower-spike, 1 to 2 inches long. Perianth pink or rarely white. Styles 3. Stamens longer than the perianth.

In moist pastures, and meadows, chiefly in hilly districts, in Europe, central and Russian Asia, and northern America, extending into the Arctic regions. Occurs in various parts of Britain, chiefly in the north of England, but is often local, and in some instances a straggler from gardens. *Fl. summer.*

7. **Amphibious Polygonum.** *Polygonum amphibium*, Linn.
(Fig. 867.)

(Eng. Bot. t. 436.)

A glabrous perennial, usually floating in water, and rooting at the lower nodes. Leaves oblong or lanceolate, rather thick, 3 to 6 inches long, spreading on the surface of the water. Spikes terminal, solitary or rarely two together, supported on short peduncles above the water, dense and cylindrical, 1 to 1½ inches long, of a rose-red. Stamens usually 5. Styles 2. Nuts flattened.

In ponds and watery ditches, in Europe, central and Russian Asia, and northern America, to the Arctic regions. Extends all over Britain. *Fl. summer*. When growing in dried-up ponds or muddy ditches the stems are creeping at the base, then shortly erect, and the leaves are often downy.



Fig. 867.

8. **Persicaria Polygonum.** *Polygonum Persicaria*, Linn.
(Fig. 868.)

(Eng. Bot. t. 756. *Common Persicaria*.)

An erect or spreading, branched annual, glabrous or slightly hoary, and often turning red, 1 to 2 feet high. Leaves lanceolate, stalked, or the upper ones sessile; the larger ones 3 to 5 inches long, and an inch broad or rather more, often marked in the centre with a dark spot. Stipules more or less fringed at the top with short fine bristles. Spikes terminal, rather numerous, oblong or cylindrical, and seldom above an inch long, dense, but not so regular as in the *amphibious P.*, and there is often a cluster of flowers a little below. Flowers reddish or sometimes green, not dotted. Stamens usually 6. Styles usually 2. Nuts flattened but rather thick, smooth and shining, and often concave on one



Fig. 868

side. Occasionally there are 3 styles, and the nut is then triangular.

In ditches, on roadsides, in cultivated and waste places, throughout Europe and central and Russian Asia to the Arctic regions. Abundant in Britain. *Fl. all summer and autumn.* It varies much in stature and in colour, in the number and density of the spikes, and in the achenes more or less concave or convex on one or both sides.

9. Pale Polygonum. *Polygonum lapathifolium*, Linn.
(Fig. 869.)

(Eng. Bot. t. 1382.)



Fig. 869.

Closely resembles the *Persicaria P.*, and is probably a mere variety, distinguished by the pedicels and perianths dotted with small prominent glands. The colour of the plant is usually pale-green, the stipules seldom fringed, and the nuts usually concave on both sides, but these characters are not constant.

In cornfields and waste places, with nearly the same range as the *Persicaria P.*, but usually in richer soils, and does not extend so far north. In Britain, recorded from England, Ireland, and southern Scotland. *Fl. summer and autumn.* Specimens agreeing with the *Persicaria P.* in everything but the glandular dots, have been described as a third species under the name of *P. laxum* (Eng. Bot. Suppl. t. 2822).

10. Waterpepper Polygonum. *Polygonum Hydropiper*, Linn. (Fig. 870.)

(Eng. Bot. t. 989.)

Stature and foliage nearly as in the *Persicaria P.*, but a more slender plant, often decumbent or even creeping at the base, the stipules more fringed at the top, the leaves narrower, and the flowers in slender spikes, often 2 or 3 inches long, more or less nodding, the clusters of flowers almost all distinct, and the lower ones often distant and

axillary. Perianths, and often the bracts and stipules or other parts of the plant, dotted with small glands, and the whole plant is more or less acrid or biting to the taste.

In wet ditches, and on the edges of ponds and streams, throughout Europe and central and Russian Asia to the Arctic regions. Abundant in England and Ireland, more rare in the Scotch Highlands. *Fl. summer and autumn.*

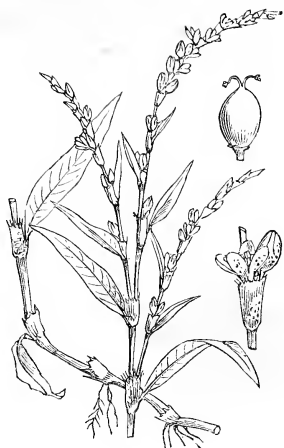


Fig. 870.

11. Slender Polygonum. *Polygonum minus*, Huds.

(Fig. 871.)

(Eng. Bot. t. 1043.)

Very near the *Waterpepper P.*, and probably a mere variety. It is usually a smaller plant, with rather smaller flowers, in closer, although slender spikes, and has neither the glandular perianths nor the biting flavour of that species.

In ditches and waste places, on roadsides, etc., over the whole range of the *Waterpepper P.* In Britain, not so common as that species, and scarcely extends into Scotland. *Fl. summer and autumn.* The smaller, most distinct form is usually found in dryer situations. When growing in richer, wet situations, it can only be distinguished from the *Waterpepper P.* by the absence of the glands on the perianth. This form has been published as a species, under the name of *P. mite* (Eng. Bot. Suppl. t. 2867). It is not improbable that further observation may show that this and the last three *Polygonums* are all varieties of one species.



Fig. 871.

LXII. THE DAPHNE FAMILY. THYMELEACEÆ.

A family limited in Britain to the single genus *Daphne*. The exotic genera associated with it differ chiefly in the number of the stamens and in the number and form of the divisions of the perianth, or in the consistence of the fruit.

The species are rather numerous in southern Africa and Australia, including among the latter the *Pimeleas* of our greenhouses, with a few from the tropics or the northern hemisphere.

I. DAPHNE. DAPHNE.

Shrubs, or, in some exotic species, trees, with alternate or rarely opposite entire leaves, and no stipules; the flowers either coloured or sometimes green, either lateral, or, in exotic species, terminal. Perianth inferior, deciduous, with a distinct tube and a spreading 4-cleft limb. Stamens 8, inserted in the top of the tube. Ovary free within the tube, 1-celled, with a single pendulous ovule. Style exceedingly short, with a capitate stigma. Fruit a berry or drupe, the endocarp forming a slightly crustaceous, 1-seeded stone.

A considerable genus, widely spread over the northern hemisphere, with a few species extending into the tropics.

Leaves deciduous. Flowers purple, below the leaves . . . 1. *Mezereon D.*

Leaves evergreen. Flowers green, axillary 2. *Spurge D.*

Several exotic species are cultivated for the beauty or the perfume of their flowers, especially the *D. odora*, *D. pontica*, *D. cneorum*, etc.

1. *Mezereon Daphne*. *Daphne Mezereum*, Linn. (Fig. 872.)
(Eng. Bot. t. 1381. *Mezereon*.)



Fig. 872.

An erect, glabrous shrub, of 1 to 3 feet, with few, erect branches, each terminated by a tuft or shoot of narrow-oblong or lanceolate, deciduous leaves, about 2 or 3 inches long. Before these leaves are fully out, the flowers appear in clusters of 2 or 3 along the preceding year's shoot: they are purple and sweet-scented. Perianth-tube 3 or 4 lines long, and slightly hairy, the lobes rather shorter. Berries red.

In woods, chiefly in hilly districts, spread over nearly the whole of Europe and Russian Asia to the Arctic regions. In Britain, however, believed to be truly wild only in some of the southern counties of England. *Fl.* early spring.

2. Spurge *Daphne*. *Daphne Laureola*, Linn. (Fig. 873.)(Eng. Bot. t. 119. *Spurge Laurel*.)

An erect, glabrous shrub, of 2 to 4 feet, with few erect branches, and ever-green, oblong or lanceolate leaves, crowded towards their summits. Flowers in clusters or very short racemes of 3 to 5 in the axils of the leaves, rather smaller than in the *Mezerion D.*, green and scentless and accompanied by more conspicuous bracts. Berries bluish-black.

In woods, in southern and western Europe, scarcely extending into Germany. Not uncommon in England, doubtfully indigenous in southern Scotland, and unknown in Ireland. *Fl. spring*.



Fig. 873.

The large and important tropical family of the *Laurels*, remarkable amongst *Monochlamyds* for the peculiar mode in which the anthers open (like those of the *Barberry*), is represented in our plantations by the *Baytree* (*Laurus nobilis*), which is the true *Laurel* of the ancients and of poets.

LXIII. THE ELÆAGNUS FAMILY. ELÆAGNACEÆ.

Shrubs or trees, more or less covered with minute, silvery or brown, scurfy scales, differing from the *Daphne* family in the erect, not pendulous, ovule and seed.

An Order of very few genera, dispersed over the northern hemisphere. The principal one, *Elæagnus*, has not the clustered male flowers so peculiar in our *Hippophæe*. One or two of its species, from south-eastern Europe and Asia, are not uncommon in our shrubberies.

I. HIPPOPHÆÆ. HIPPOPHÆÆ.

A single species, distinguished as a genus by its dicecious flowers; the males in axillary clusters, with a perianth of 2 small segments and

4 stamens; the females solitary, with a tubular perianth, minutely 2-lobed, which becomes succulent, forming a berry round the true fruit. The reduced perianth and clustered flowers show considerable affinity with *Gale* in the *Catkin* family.

1. Common Hippophae. *Hippophae rhamnoides*, Linn.

(Fig. 874.)

(Eng. Bot. t. 425. *Sallow-Thorn. Sea-Buckthorn.*)



Fig. 874.

A willow-like shrub, covered with a scaly scurf, very close and silvery on the under side of the leaves, thin or none on the upper side, dense, and more or less rusty on the young shoots and flowers, the axillary shoots often ending in a stout prickle. Leaves alternate, linear, and entire. Male flowers very small, in little clusters resembling catkins. Females crowded, although solitary in each axil; the perianth about 2 lines long, contracted at the top, with the style shortly protruding, forming when in fruit a small yellowish or brown berry.

In stony or sandy places, especially in beds of rivers and torrents, in central and eastern Europe and central and Russian Asia, also occasionally near the sea-coasts of the Baltic and the North Sea. In Britain, very local, and only near the sea-coasts of some of the eastern counties of England. *Fl. spring.*

LXIV. SANDALWOOD FAMILY. SANTALACEÆ.

A family limited in Britain to a single species, but comprising several exotic genera, chiefly tropical or southern, differing from the *Daphne* family in the perianth combined with the ovary at its base, in its valvate, not imbricate, lobes, and in minute but important particulars in the structure of the ovary.

I. **THESIUM.** THESIUM.

Low herbs or undershrubs, with alternate entire leaves, no stipules,

and small flowers. Perianth adhering to the ovary at the base; the limb divided into 4 or 5 lobes or segments, valvate in the bud. Stamens 4 or 5, opposite the lobes of the perianth. Ovary inferior, 1-celled, with 2 ovules suspended from a central placenta. Style short, with a capitate stigma. Fruit a small green nut, crowned by the lobes of the perianth. Seed solitary, with a small, straight embryo in the top of the albumen.

A considerable genus, widely spread over Europe and temperate Asia, but chiefly abundant in southern Africa. Some of the European species have been ascertained to be partially parasitical on the roots of other plants, to which they attach themselves by means of expanded suckers, like the *yellow Rattle* and some others of the *Scrophularia* family.

1. **Flax-leaved Thesium.** *Thesium linophyllum*, Linn.

(Fig. 875.)

(Eng. Bot. t. 247. *T. humifusum*, Bab. Man. *Bastard Toadflax*.)

A glabrous, green perennial, forming a short, woody rootstock, with several annual, procumbent or ascending, stiff stems, usually simple, 6 or 8 inches long, but sometimes near a foot. Leaves narrow-linear, or, when very luxuriant, rather broader, and above an inch long. Flowers small, in a terminal raceme, leafy, and sometimes branching at the base; each flower on a distinct peduncle, with 3 linear bracts close under it. Perianth cleft almost down to the ovary; the tube of a greenish-yellow colour; the segments white, waved or almost toothed on the edges, and rolled inwards after flowering. Nuts small, ovoid, marked with several longitudinal veins or ribs.

In meadows and pastures, attaching itself to the roots of a great variety of plants, generally dispersed over temperate Europe and Russian Asia, but not extending into Scandinavia. In Britain, only in the chalky pastures of the southern counties of England. *Fl. all summer.*



Fig. 875.

LXV. THE ARISTOLOCHIA FAMILY. ARISTOLOCHACEÆ.

Herbs, or, in exotic species, tall climbers, with alternate leaves, and often leafy stipules; the flowers brown or greenish. Perianth combined with the ovary at the base, either 3-lobed or very irregular. Stamens usually 6 or 12, inserted on the summit of the ovary within the perianth. Ovary and fruit inferior, 3- or 6-celled, with several seeds in each cell. Albumen fleshy, with a minute embryo.

A small family, widely spread over the globe, chiefly in the warmer districts. The principal genus, *Aristolochia*, remarkable for the tubular perianth, often curved, terminating in an oblique, entire limb, is not British; but the tall, climbing *A. sipho*, and some other species, are often cultivated in our gardens; and the *A. clematitis* (Eng. Bot. t. 398), from southern Europe, has been occasionally found in stony, rubbishy places in some parts of England, where it has strayed from gardens. It is an erect perennial, of about 1½ feet, with broadly cordate leaves, and slender, yellowish-green flowers clustered in their axils.

I. ASARUM. ASARUM.

Perianth campanulate, regular, 3-cleft. Stamens 12.

A genus of very few species, dispersed over Europe, temperate Asia, and North America.

1. Common Asarum. *Asarum europæum*, Linn. (Fig. 876.) (Eng. Bot. t. 1083. *Asarabacca*.)

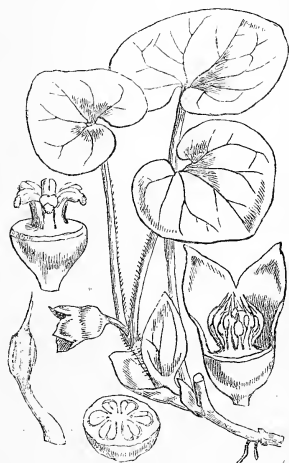


Fig. 876.

A low perennial, with a shortly creeping rootstock, and very short, inconspicuous stems. Leaves usually 2 only, almost radical, on long stalks, orbicular-cordate or kidney shaped, 1 to 2 or even 3 inches broad. Between them is a single greenish-brown flower, about half an inch long, on a short, recurved stalk; the perianth divided to the middle into 3 broad, pointed lobes.

In woods and shady places, in central and southern Europe and temperate Russian Asia, extending northwards into southern Scandinavia. Rare in Britain, but believed to be a true native in a few localities in the north of England and in Wiltshire. *Fl. May*.

LXVI. SPURGE FAMILY. EUPHORBIACEÆ.

Herbs, shrubs, or trees, much varied in foliage and inflorescence. Flowers always unisexual, with or without a perianth. Stamens various. Ovary consisting of 3 (rarely 2 or more than 3) united carpels, each with 1 or 2 pendulous ovules. Styles as many as carpels, entire or divided. In the fruit these carpels separate from each other and from the persistent axis, and usually open with elasticity in two valves. Seed with a large embryo in fleshy albumen.

A vast family, chiefly tropical, so varied in aspect that no general idea can be formed of it from the three genera which represent it in Britain, nor is the connection between these three genera easily understood without a comparison with intermediate exotic forms. The structure of the ovary and fruit is peculiar to this family amongst unisexual plants.

Several male flowers (looking like single stamens) and one stalked ovary collected in a small involucre, which has the appearance of a cup-shaped perianth 1. SPURGE.

Male and female flowers distinct.

Herbs, with thin leaves 2. MERCURY.

Shrubs, with shining, evergreen leaves 3. BOX.

The *Poinsettia* of our hothouses, remarkable for its brilliant red bracts, belongs to this family, but generally speaking the tropical *Euphorbiaceæ* are not ornamental enough for cultivation.

I. SPURGE. EUPHORBIA.

The European species are herbs, abounding in milky juice; the lower part of the stems simple, with alternate leaves (except in the *caper S.*). Flowering branches or peduncles axillary, the upper ones in a terminal umbel of 2 to 5 or more rays, each ray or axillary peduncle usually several times forked, with a pair of opposite floral leaves at each fork, and a small green, apparent flower, really a head of flowers between the branches. These *flower-heads* consist of a small, cup-shaped *involucre* (looking like a perianth), with 4 or 5 very small teeth, alternating with as many horizontal yellowish or brown *glands*. Within are 10 to 15 stamens, each with a jointed filament, and a minute scale at its base, showing that they are each a distinct male flower. In the centre is a single female flower, consisting of a 3-celled ovary, supported on a stalk projecting from the involucre and curved downwards. Style 3-cleft. Fruit of 3 carpels, each with a single seed.

A very large genus, extending almost over every part of the globe, including many shrubby species in the tropics, or large, leafless, succulent ones in southern Africa.

Prostrate plant, with all the leaves at the time of flowering

floral and opposite, with minute stipules 1. *Purple S.*

Stem erect or decumbent at the base, the lower leaves alternate, and no stipules.

Glands of the involucre rounded on the outer edge.

Annuals or biennials. Leaves finely toothed.

Leaves obovate, very obtuse. Capsules smooth 2. *Sun S.*

Stem-leaves oblong, usually pointed. Capsules more or less warted 3. *Broad S.*

Perennials. Leaves entire.

Umbel compact. Capsules glabrous, much warted 4. *Irish S.*

Umbel loose. Capsules smooth, or rough with small glandular dots, often hairy 5. *Hairy S.*

Glands of the involucre crescent-shaped, the two points turned outwards.

Floral leaves of each pair united at the base 12. *Wood S.*

Floral leaves all distinct.

Umbel of 3 or 4 rays.

Low, green annuals, seldom above 6 inches high.

Stem-leaves linear 7. *Dwarf S.*

Stem-leaves broadly obovate, stalked 6. *Petty S.*

Tall, very glaucous biennial, with large capsules 8. *Caper S.*

Umbel of 5, rarely 6, rays.

Leaves crowded, thick and leathery. Umbel compact. Seeds smooth 10. *Sea S.*

Leaves rather thin. Umbel spreading. Seeds pitted 9. *Portland S.*

Umbel of 8 or more rays 11. *Leafy S.*

The *E. Characias* (Eng. Bot. t. 442), a tall, south European species, with a handsome, oblong, crowded, leafy panicle, variegated by the contrast of the purple glands of the involucre and the green bracts, has been often cultivated in gardens, and where once planted will remain many years, but does not permanently establish itself. One or two tropical shrubby species with scarlet involucre are cultivated in our hothouses, and several south African succulent ones may be met with in cactus-houses.

1. Purple Spurge. *Euphorbia Peplis*, Linn. (Fig. 877.)

(Eng. Bot. t. 2002.)

A glabrous annual, of a glaucous or purple hue; the very short main stem loses all its leaves before flowering, and divides close to the base

into an umbel of 3 or 4 rays, so that the whole plant appears to consist of the repeatedly forked flowering branches, closely prostrate on the sand, and forming patches of 6 inches to a foot or more in diameter. Floral leaves opposite, numerous, very oblique, broadly oblong, very obtuse and rather thick, with minute stipules at their base. Flower-heads very small. Glands of the involucre expanding into small, whitish or purple scales. Capsule glabrous and smooth. Seeds not pitted.



Fig. 877.

In maritime sands, all round the Mediterranean, and up the western coasts of Europe to the English Channel. In Britain, only on the southern and south-western coasts of England, where it is now becoming scarce, and near Tramore, county Waterford, in Ireland. *Fl. summer and autumn.*

2. Sun Spurge. *Euphorbia Helioscopia*, Linn. (Fig. 878.)

(Eng. Bot. t. 883.)

An erect or ascending annual, 6 or 8 inches to a foot high, simple or with a few branches ascending from the base. Stem-leaves obovate or broadly oblong, and narrowed into a short stalk; floral leaves broadly obovate or orbicular, all very obtuse and minutely toothed. Umbel of 5 rays, each ray once or twice forked at the end, but the branches so short that the flowers and floral leaves appear crowded into broad, leafy heads. Glands of the involucre entire and rounded. Capsules glabrous and smooth. Seeds pitted.

In cultivated and waste places, in Europe and western Asia, extending further north than most species, yet not an Arctic plant. Common in Britain. *Fl. the whole season.*



Fig. 878.

3. Broad Spurge. *Euphorbia platyphyllos*, Linn.

(Fig. 879.)

(*E. stricta*, Eng. Bot. t. 333, a starved specimen.)



Fig. 879.

An erect annual or biennial, sometimes slender and only 6 inches high, but usually 1 to 2 feet, glabrous or very slightly downy. Stem-leaves oblong or almost lanceolate, mostly pointed, and very finely toothed; floral leaves broadly cordate or orbicular, often with a yellowish tint. Umbel of about 5 (rarely 4 or 3) rays, besides several flowering branches from the axils of the upper stem-leaves: these rays are slender, usually divided into 3, 4, or even 5 secondary, simple or forked rays. Glands of the involucre entire and rounded. Capsule smaller than in most species, more or less warted, glabrous or hairy. Seeds not pitted.

In cultivated and waste places, in central and southern Europe and western Asia, but not extending into Scandinavia. In Britain, only in southern England, and here and there as a weed of cultivation further north. *Fl. summer and autumn.*

4. Irish Spurge. *Euphorbia hibernica*, Linn. (Fig. 880.)

(Eng. Bot. t. 1337.)



Fig. 880.

A perennial, with several ascending or nearly erect stems, 1 to 1½ feet high, either glabrous or the stems and under side of the leaves more or less softly hairy. Leaves broadly oblong, entire, often 2 inches long or more. Umbel compact, of 5 rays, once or twice shortly forked, and but little longer than the leaves immediately under it. Floral leaves large and ovate, often yellowish. Glands of the involucre entire and rounded. Capsule rather large, strongly warted, but not hairy. Seeds not pitted.

In woods and mountain pastures, in western Europe, and chiefly in the Pyrenees, in western and central France, and in Ireland. In England, only

in a few localities in Devonshire, and not known in Scotland. *Fl. early summer.*

5. Hairy Spurge. *Euphorbia pilosa*, Linn. (Fig. 881.)

(Eng. Bot. Suppl. t. 2787, and *E. coralloides*, Suppl. t. 2837. *E. palustris*, Brit. Fl.)

A perennial, somewhat resembling the *Irish S.*, but more erect, either softly hairy, especially on the under side of the leaves, or nearly glabrous in a Continental variety. Stem-leaves oblong, like those of the *Irish S.*, but those under the umbel shorter. Umbels usually of 5 rays, with a few axillary branches below it; the rays much longer, and more branched than in the *Irish S.* Capsules rather smaller, though much larger than in the *broad S.*, not really warted, but usually covered with small, raised, glandular dots, glabrous or hairy. Seeds not pitted.

In moist woods and thickets, on shady banks, in central and southern and especially eastern Europe, and western Asia, but not approaching nearer to Britain than the Loire. It has, however, long been known apparently wild in the neighbourhood of Bath, and has been introduced into Sussex. *Fl. early summer.*



Fig. 881.

6. Petty Spurge. *Euphorbia Peplus*, Linn. (Fig. 882.)

(Eng. Bot. t. 959.)

An erect or decumbent, glabrous annual, 6 inches to a foot high, branching from the base. Stem-leaves obovate, entire, shortly stalked. Umbel of 2 or 3 repeatedly forked rays, often occupying the greater part of the plant. Floral leaves broadly ovate or cordate. Flower-heads small. Glands of the involucre crescent-shaped,

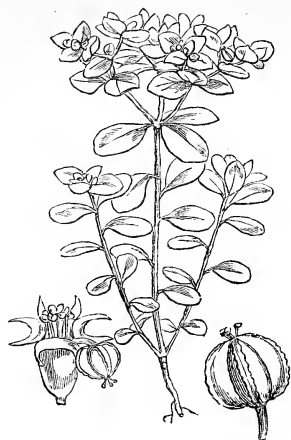


Fig. 882.

with long points. Capsule glabrous and smooth, with a longitudinal rib or narrow wing to each carpel. Seeds pitted.

In cultivated and waste places, throughout Europe and Russian Asia, except the extreme north. Abundant in England, Ireland, and a great part of Scotland. *Fl. the whole summer and autumn.*

7. Dwarf Spurge. *Euphorbia exigua*, Linn.

(Fig. 883.)

(Eng. Bot. t. 1336.)



Fig. 883.

A slender, glabrous annual, with several erect or ascending stems, from 1 or 2 to 6 or 8 inches high. Stem-leaves numerous, small and narrow. Umbels of 3 or 4, rarely 5 rays, sometimes contracted into terminal heads, more frequently elongated and forked. Floral leaves usually lanceolate. Glands of the involucre crescent-shaped, with fine points. Capsules small, smooth or slightly warted at the angles. Seeds slightly wrinkled.

In cultivated and waste places, in central and southern Europe and western Asia, extending northwards to southern Sweden. Abundant in most parts of England and Ireland, but only in southern Scotland. *Fl. the whole season.*

8. Caper Spurge. *Euphorbia Lathyris*, Linn. (Fig. 884.)*(R. aquaticus, Eng. Bot. t. 2255.)*

A tall, stout annual or biennial, often 3 feet high or even more, very smooth and glaucous. Stem-leaves narrow-oblong, the upper ones broader, especially at the base, often 3 or 4 inches long, and all opposite, not alternate as in other *Spurges*. Umbels of 3 or 4 long rays, once or twice forked, with large ovate-lanceolate floral leaves. Glands of the involucre crescent-shaped, the points short and blunt. Capsules large and smooth. Seeds wrinkled.

A native of southern Europe and west central Asia, long since cultivated in cottage gardens, and often establishes itself as a weed in their vicinity. *Fl. summer.*



Fig. 884.

9. Portland Spurge. *Euphorbia segetalis*, Linn. (Fig. 885.)*(E. Portlandica, Eng. Bot. t. 441.)*

An inland southern variety is annual or biennial, the British maritime form lasts probably several years, becoming hard at the base, with several decumbent or ascending stems, a few inches to near a foot high. Stem-leaves narrow, of a pale green or glaucous, but not thick and leathery as in the *sea S.* Umbel of 5 repeatedly forked rays, the floral leaves all very broadly cordate. Glands of the involucre crescent-shaped, with fine points. Capsule smooth or with small raised dots on the angles. Seeds pitted.

In sandy or stony, waste or cultivated places, especially near the sea. Very common in the Mediterranean region, the strictly maritime perennial variety



Fig. 885.

extending also up the western coasts of Europe to the Channel. In Britain, along the southern and western coasts of England up to Galloway in Scotland, and also in Ireland. *Fl. summer and autumn.* The northern specimens are usually shorter and more compact, with shorter and more obtuse stem-leaves than the southern ones, but a very gradual passage may be traced from the one to the other.

10. Sea Spurge. *Euphorbia Paralias*, Linn. (Fig. 886.)

(Eng. Bot. t. 195.)



Fig. 886.

A perennial, with a short, hard, almost woody stock; the stems ascending or erect, 6 inches to near a foot high, crowded with short, concave, rather thick and leathery leaves, of a very pale green. Umbel compact, of 5 rays, and often a few axillary flowering branches below it. Lower leaves narrow, but passing gradually into the broad, ovate-cordate floral leaves. Glands of the involucre crescent-shaped, with short points. Capsules smooth. Seeds not pitted.

In maritime sands, round the Mediterranean and up the western coasts of Europe to Holland. In Britain, along the southern coasts, up to Dublin in Ireland, and to Cumberland and Suffolk in England. *Fl. autumn.*

11. Leafy Spurge. *Euphorbia Esula*, Linn. (Fig. 887.)

(Eng. Bot. t. 1399.)

A glabrous perennial, readily distinguished from all the preceding species by the terminal umbel of 8 to 12 or more rays. Stems 1 to 1½ feet high, the leaves varying from oblong-lanceolate to linear, of a glaucous green. Floral leaves broadly cordate or orbicular, often yellow. Glands of the involucre crescent-shaped, and rather pointed. Capsules minutely granulated, but not warted. Seeds not pitted.

On river-banks and hilly wastes, in central and especially southern

Europe, and western Asia, extending, however, northwards into southern Scandinavia. Probably not indigenous in Britain, but is said to have established itself on the banks of the Tweed, and in a few localities in southern Scotland. *Fl. summer.* Starved, narrow-leaved states of this plant have been taken for *E. Cyparissias*, a more southern Continental species.



Fig. 887.

12. Wood Spurge. *Euphorbia amygdaloides*, Linn.
(Fig. 888.)

(Eng. Bot. t. 256.)

Stock perennial and almost woody, with several erect, often reddish stems, 1 to 2 feet high, glabrous or slightly hairy. Stem-leaves rather crowded towards the middle of the stem, lanceolate or narrow-oblong; the upper ones more distant, and shorter. Umbel of 5 long rays, not much divided, with a few axillary peduncles below it. Floral leaves of each pair always connected into one large orbicular one, of a pale yellowish-green. Glands of the involucre crescent-shaped, with rather long points. Capsules and seeds smooth.

In woods and thickets, in temperate and southern Europe and western Asia, but not extending into Scandinavia. In Britain, common over the greater part of England, rare in northern England, in Ireland only in one station near Bandon, and unknown in Scotland. *Fl. spring.*

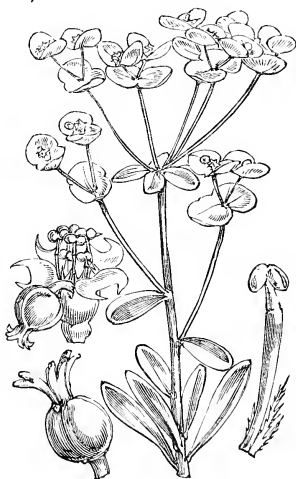


Fig. 888.

II. **MERCURY.** MERCURIALIS.

Erect herbs, with opposite leaves, and small green flowers in little clusters, either sessile, stalked, or spiked in the axils of the leaves, the males and females distinct, on the same or on separate plants. Perianth of 3 segments. Male flowers with 9 to 12 stamens. Females with a 2-celled ovary, crowned by 2 simple styles, and surrounded by 2 or 3 small filaments. Capsule 2-celled, otherwise like that of *Spurge*.

A small genus, spread over the temperate regions of the southern as well as the northern hemisphere, and nearly connected with several more tropical genera of weed-like, uninteresting plants.

Rootstock perennial. Stems simple. Flowers all in loose

spikes 1. *Perennial M.*

Root annual. Stem branched. Female flowers sessile or

shortly stalked 2. *Annual M.*

1. **Perennial Mercury.** *Mercurialis perennis*, Linn.

(Fig. 889.)

(Eng. Bot. t. 1872. *Dog's Mercury*.)



Fig. 889.

Rootstock slender and creeping. Stems erect, simple, 6 or 8 inches, or rarely nearly a foot high. Leaves rather crowded in the upper half, oblong or ovate-lanceolate, 2 to 4 or 5 inches long, usually pointed, crenate or serrated, and rough or shortly hairy. Flowers dioecious, on slender axillary peduncles, often nearly as long as the leaves; the males in little clusters, the females singly or 2 together. Ovaries larger than the perianth, with rather long, spreading styles. Capsules more or less covered with warts or soft prickles.

In woods and shady places, throughout Europe and Russian Asia, except the extreme north. Abundant in England, and a great part of Scotland, very rare in Ireland. *Fl. early spring, commencing before its leaves are fully out.*

2. **Annual Mercury.** *Mercurialis annua*, Linn. (Fig. 890.)

(Eng. Bot. t. 559.)

An erect, glabrous annual, 6 inches to a foot high, with opposite

branches. Leaves stalked, ovate or oblong, rather coarsely toothed, of a thin texture. Male flowers clustered, as in the *perennial M.*, along slender peduncles nearly as long as the leaves. Females 2 or 3 together, either sessile or shortly stalked, in the axils of the leaves, usually on separate plants from the males.

In cultivated and waste places ; very common in central and southern Europe and eastward to the Caucasus, more rare towards the north, and only as an introduced weed of cultivation in Scandinavia. Not generally common in England or Ireland, very local and doubtfully indigenous in Scotland. *Fl. the whole summer and autumn.* A variety with more sessile leaves and flowers, the latter often monœcious, has been described as a species, under the name of *M. ambigua* (Eng. Bot. Suppl. t. 2816). It is not common, even on the Continent, but has been found in Jersey and in the south of England.



Fig. 890.

III. **BOX.** BUXUS.

Flowers monœcious, the males and females clustered in the same axil, but not enclosed in a common involucre. Perianth small, of 4 segments. Stamens 4 in the male flowers. Styles 3 in the females. Capsule 3-celled, with 2 seeds in each cell.

A genus probably limited to a single species.

1. **Common Box.** *Buxus sempervirens*, Linn. (Fig. 891.)

(Eng. Bot. t. 1341.)

A glabrous, much branched, evergreen shrub, attaining 6 or 8 feet in height when left uncut. Leaves opposite, entire, thick and shining, varying from ovate to oblong, $\frac{1}{2}$ to 1 inch long. Flowers small, green, and sessile, usually several males and one or two females in the same axillary cluster, the former with one small bract under the perianth, the female with 3 bracts. Capsule sessile, ovoid, of a hard consistence, about 3 or 4 lines long, ending in 3 stiff, short beaks.



Fig. 891.

In hilly, rocky, chiefly limestone districts, in western and southern Europe, extending eastward to the Caucasus and northward into many parts of central and western France. In Britain, only in some localities in southern England, and even there it is doubted whether it may not have been introduced, as it has long been much planted in shrubberies. *Fl. spring.* The *Box* used for edging in gardens is a dwarf variety of the same species.

LXVII. EMPETRUM FAMILY. EMPETRACEÆ.

A family or genus of six or seven European or North American species, whose affinities have not been satisfactorily made out. The structure and position of the seeds prevent its union with the *Spurge* family, to which it might in other respects be technically referred.

I. CROWBERRY. EMPETRUM.

Low, creeping, heath-like shrubs, with small, crowded, entire, evergreen leaves, and minute, axillary, dioecious flowers. Perianth of 6 scales in 2 rows, with 6 external, similar, but smaller bracts. Stamens 3 in the male flowers. Style in the females very short, divided into 6 or more radiating and toothed or divided stigmas. Ovary with as many cells as stigmas, and a single erect ovule in each. Fruit a small berry-like drupe, containing several small 1-seeded stones. Embryo slender, in a copious albumen.

1. Common Crowberry. *Empetrum nigrum*, Linn.

(Fig. 892.)

(Eng. Bot. t. 526.)

A glabrous plant, forming spreading, thickly branched tufts, like those of the *trailing Loiseleuria*, often a foot in diameter; the crowded

evergreen leaves scarcely 2 lines long, with their edges rolled back as in the *Heaths*. Flowers sessile, very minute, the stamens of the males protruding from the perianth on slender filaments. Fruit black, globular, about the size of a pea.

In mountain heaths and bogs, in Europe, Asia, and North America, very abundant at high northern and Arctic latitudes, and quite alpine in southern Europe and central Asia. Common in Scotland, in northern and western England, and in Ireland, but now probably extinct in southern England. *Fl. spring*.



Fig. 892.

LXVIII. THE CALLITRICHE FAMILY. CALLITRICHINEÆ.

Aquatic, floating herbs, with opposite or whorled leaves, and minute unisexual flowers in their axils. No perianth. Ovary and fruit either 1-seeded, or 4-lobed with 1 seed in each lobe.

Two genera, each of a single species, always placed next each other though not usually united into one family. Allied in many respects to the aquatic genera of the *Enothera* family, they are sometimes placed next to them; but there is no perianth, and they are therefore more frequently enumerated amongst anomalous *Monochlamyds*.

I. CERATOPHYLL. CERATOPHYLLUM.

Leaves whorled and dissected. Stamens several. Style 1. Ovary and fruit entire, with a single seed.

1. Common Ceratophyll. *Ceratophyllum demersum*, Linn. (Fig. 893.)

(Eng. Bot. t. 947, and *C. submersum*, t. 679. *Hornwort*.)

A glabrous perennial, the stems floating like those of a *Myriophyll*,

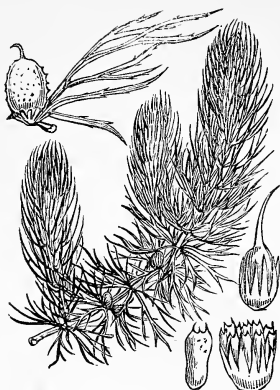


Fig. 893.

and the leaves are whorled in the same manner, but instead of being pinnately divided they are twice or thrice forked, with linear, often fine and subulate segments, usually slightly toothed on the edge. Flowers small, and sessile in the axils of the leaves, each one surrounded by a whorl of minute bracts, but without any real perianth; the males consisting of 12 to 20, sessile, oblong anthers, the females of a small ovary with a simple style. Fruit an ovoid, slightly compressed nut, 2 to 3 lines long, either smooth or with a few tubercles or prickles, either scattered over the surface or united in a slightly prominent wing round the edge.

In pools, slow streams, and shallow margins of lakes, dispersed almost all over the globe. Not uncommon in Britain. *Fl. summer, but very seldom.*

II. CALLITRICHE. CALLITRICHE.

Leaves opposite, entire. Stamens solitary. Styles 2. Ovary and fruit 4-lobed and 4-seeded.

1. Common Callitriche. *Callitriche aquatica*, Sm.

(Fig. 894.)

(Eng. Bot. t. 722, and *C. autumnalis*, Suppl. t. 2606 and t. 2732. *C. pedunculata*, Brit. Fl. *C. platycarpa*, Bab. Man.)



Fig. 894.

A glabrous, slender perennial, either floating in water or creeping and rooting in wet mud, flowering young so as to appear annual, varying in length according to the depth of the water. Leaves either all obovate or oblong, 1 to 6 lines long, or the lower submerged ones narrow-linear, and obtuse or notched at the top; the upper ones obovate, and spreading in little tufts on the surface of the

water, or all submerged and linear. Flowers minute, usually solitary in each axil, between 2 minute bracts varying much in size and sometimes wholly wanting. Male flowers consisting of a single stamen with a conspicuous filament; the females of a sessile or stalked ovary, with 2 erect or recurved styles. Fruit from $\frac{1}{2}$ to 1 line in diameter, the lobes either rounded or keeled on the edge, or surrounded by a narrow wing.

In shallow waters or wet mud, dispersed almost all over the globe. Abundant in Britain. *Fl. the whole season.* It has been variously divided into from 2 to about 20 supposed species, from slight differences in the size and form of the fruits, the direction of the styles, in the bracts, etc., or from the presence or absence of the upper obovate leaves; but the distinctive characters which have been given, all fail when applied to a large number of specimens collected in different parts of the world.

LXIX. THE NETTLE FAMILY. URTICACEÆ.

Herbs, or, in exotic genera, trees or shrubs, with leaves usually rough or stinging, more or less conspicuous stipules, and small, herbaceous, unisexual flowers. Perianth in the males regular and simple. Stamens as many as segments of the perianth and opposite to them, or rarely fewer. Perianth of the females often less divided. Ovary free or rarely adherent to the perianth, with a single ovule, and 1 or 2 styles or stigmas. Fruit small, 1-seeded, dry or rarely succulent. Seed with or without albumen, the radicle pointing upwards.

A very large Order, chiefly tropical, of which the few British species give a very inadequate idea. It is readily distinguished from the *Spurge* family by the single-seeded fruit, from the *Catkin* family by the regular perianth of the male flowers.

Erect herbs. Leaves opposite	1. NETTLE.
Erect or procumbent herb. Leaves alternate	2. PELLITORY.
Tall twiner. Leaves opposite	3. HOP.

Among exotic genera in cultivation may be mentioned the *Hemp* (*Cannabis*), which, although an erect herb, is in many respects allied to the *Hop*; the *Fig* (*Ficus*), in which the flowers are collected in great numbers withinside a succulent receptacle, popularly called the fruit; and the *Mulberry* (*Morus*), in which the flowers are collected in heads on the outside of a receptacle, and become succulent as the fruit ripens.

I. **NETTLE.** URTICA.

Erect herbs, with stinging hairs and opposite leaves. Flowers in axillary clusters or spikes; the males with a perianth of 4 segments and 4 stamens; the females with a perianth of 2 segments, or, if 4, the 2 inner ones larger. Fruit a flattened seed-like nut, enclosed in the perianth. Stigma single, sessile, and tufted.

A considerable genus, generally distributed over the globe.

Annual and monœcious. Flowers in nearly sessile short clusters 1. *Small N.*

Annual and monœcious. Male flowers in loose spikes. Females in stalked, globular heads 2. *Roman N.*

Perennial, usually diœcious. Flowers in branched spikes . . . 3. *Common N.*

1. **Small Nettle.** *Urtica urens*, Linn. (Fig. 895.)

(Eng. Bot. t. 1236.)



Fig. 895.

An erect, branching annual, seldom above a foot high and often only a few inches, glabrous with the exception of the stiff, stinging hairs. Leaves ovate or elliptical, deeply and regularly toothed, more tender than in the two other species. Flowers male and female intermixed, in small, loose, almost sessile axillary clusters.

In cultivated and waste places, especially in rich soils, throughout Europe and Russian Asia, from the Mediterranean to the Arctic regions, and carried out as a weed of cultivation to other parts of the world. Common in Britain. *Fl. the whole season.*

2. **Roman Nettle.** *Urtica pilulifera*, Linn. (Fig. 896.)

(Eng. Bot. t. 148.)

An annual like the last, but coarser and taller, attaining 2 feet, and very stinging. Leaves ovate or heart-shaped, deeply and regularly toothed. Male flowers in little, distinct clusters, along peduncles

often as long as the leaves; the females in globular heads, on the summit of a peduncle from $\frac{1}{2}$ to 1 inch long. When in fruit these heads are 4 or 5 lines in diameter, and thickly beset with stinging bristles.

On roadsides, and in waste places, in southern Europe. Further north only as an introduced weed in the neighbourhood of villages and habitations, and as such occurs occasionally in some parts of England. *Fl. summer and autumn.*



Fig. 896.

3. Common Nettle. *Urtica dioica*, Linn. (Fig. 897.)

(Eng. Bot. t. 1750.)

Rootstock perennial and creeping. Stems erect, 2 or 3 feet high, the whole plant of a dark green, and more or less downy, besides the copious stinging bristles. Lower leaves cordate-ovate, the upper ones more or less lanceolate, narrowed at the point, coarsely toothed. Flowers usually diœcious, both the males and females clustered in axillary, branched, spreading spikes, usually about the length of the leaves.

Along hedges, on roadsides, and in waste places, throughout Europe and Russian Asia, from the Mediterranean to the Arctic regions, and carried out as a weed to other parts of the globe. *Fl. summer and autumn.*



Fig. 897.

II. **PELLITORY.** *PARIETARIA.*

Herbs, with alternate, often entire leaves, and not stinging. Flowers

in small axillary clusters, surrounded by a few bracts, often united into a small involucre. Male flowers like those of *Nettle*, but usually very few. Females with a tubular or campanulate, 4-lobed perianth, enclosing the ovary and adhering to the seed-like fruit. Stigma single, tufted, sessile or with a distinct style. Besides these there are a few hermaphrodite flowers, which become enlarged after flowering, but seldom ripen their seed.

A genus of several species, chiefly from the Mediterranean region and central Asia, with one American one widely spread over a great part of the world.

1. **Wall Pellitory.** *Parietaria officinalis*, Linn. (Fig. 898.)

(Eng. Bot. t. 879.)



Fig. 898.

A small, branching perennial, erect the first year, afterwards usually diffuse or procumbent, 6 inches or rarely a foot long, more or less downy with short soft hairs. Leaves stalked, varying from ovate to oblong, quite entire. Flowers in sessile clusters, the involucre very small, consisting of 2 or 3 divided bracts.

On old walls, and in waste, stony places, throughout Europe and Russian Asia, except the extreme north. Common in England, Ireland, and southern Scotland, but rare in the north. *Fl. the whole summer.*

III. **HOP.** *HUMULUS*.

A single species, differing from all others of the *Nettle* family by its twining habit, by the inflorescence, and by the seed, which contains a flat, spirally coiled embryo, without albumen.

1. **Common Hop.** *Humulus Lupulus*, Linn. (Fig. 899.)

(Eng. Bot. t. 427.)

Rootstock perennial, the stems annual, but twining to a considerable height over bushes and small trees. Leaves opposite, stalked, broadly

heart-shaped, deeply 3- or 5-lobed, and sharply toothed, very rough but not stinging. Flowers diœcious, the males in loose panicles in the upper axils, small, and of a yellowish-green. Perianth of 5 segments. Stamens 5. Female flowers in shortly stalked, axillary, ovoid or globular spikes or heads, conspicuous for their broad, closely-packed bracts, each with 2 sessile flowers in its axil. Perianth a concave scale enclosing the ovary. Stigmas 2, long and linear. After flowering, the scales of the spike (often called a *cone*) become much enlarged, quite concealing the seed-like fruits.

In hedges, thickets, and open woods, all over Europe and central and Russian Asia, except the extreme north. Extends over England, Ireland, and here and there into Scotland, but probably, in the north at least, only as an introduced plant, having long been in general cultivation. *Fl. summer.*



Fig. 899.

LXX. THE ELM FAMILY. ULMACEÆ.

Trees or shrubs, differing from the *Nettle* family in their flowers mostly hermaphrodite, and the ovary generally 2-celled, although the fruit has but one seed.

Besides the *Elm* genus there are but very few, either tropical or from the warmer parts of the northern hemisphere.

I. **ELM.** ULMUS.

Trees, with alternate, deciduous leaves, and small flowers in clusters, appearing before the leaves on the preceding year's wood. Perianth campanulate, with 4 to 6 short lobes or teeth, and as many stamens. Ovary flat, with 2 short, diverging styles, and divided into 2 cells, each with a single pendulous ovule. Fruit flat, thin, and leaf-like, slightly thickened at the centre, where it contains one pendulous seed.

A small genus, spread over the temperate regions of the northern hemisphere.

- Fruit slightly notched at the top, the seed-bearing cavity placed considerably below the notch 1. *Wych E.*
 Fruit deeply notched, the notch almost reaching the seed-bearing cavity 2. *Common E.*

1. **Wych Elm.** *Ulmus montana*, Sm. (Fig. 900.)

(Eng. Bot. t. 1887, and *U. major*, t. 2542.)



Fig. 900.

A tree of considerable size and picturesque form; the large branches spreading from near the base unless when drawn up in its youth. Leaves nearly sessile, broadly ovate, bordered with double teeth, and very unequal or oblique at the base, usually rough on the upper side and downy underneath. Flowers reddish, in dense clusters, surrounded by brownish bracts, which soon fall off; the pedicels scarcely as long as the perianth. Fruits green and leaf-like, broadly ovate or orbicular, 6 to 9 lines long, with a small notch at the top; the seed suspended in a small cavity near the centre of the fruit.

Chiefly in hilly districts, in northern and western Europe. In Britain, it is the common wild *Elm* of Scotland, Ireland, and northern and western England, but seldom planted, and rare in south-eastern England, where a variety of the *common E.* is often called *wych Elm*. *Fl.* early spring, before the leaves come out.

2. **Common Elm.** *Ulmus campestris*, Sm. (Fig. 901.)

(Eng. Bot. t. 1886, *U. suberosa*, t. 2161, and *U. glabra*, t. 2248.)

Very near the *wych E.*, and many botanists consider the two races as forming but one species. The *common E.* appears however to be generally, if not constantly, distinguished by the fruit, which is deeply notched, the top of the seed-bearing cavity almost reaching the notch. It is usually also a taller and straighter-growing tree, attaining in rich soils above a hundred feet; the young branches are more slender, and the leaves usually smaller and less coarse; but all these characters are very variable.

Widely spread over central, southern, and eastern Europe, and western Asia, and the most generally planted species. In Britain, it is the most frequent one in central, southern, and eastern England, but

in the north and the west only where planted. It is indeed doubtful whether it be really indigenous anywhere in Britain. *Fl. early spring, before the leaves come out.* It varies with the leaves nearly smooth and glabrous, and the bark becomes corky, even on the young branches, more frequently than in the *wych E.*; but the supposed species established on these characters do not come true from seed.

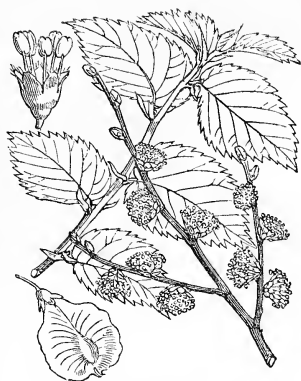


Fig. 901.

LXXI. THE CATKIN FAMILY. AMENTACEÆ.

Trees or shrubs, with alternate flat leaves, usually with stipules, and small, unisexual flowers, in cylindrical, oblong, or globular spikes, called *catkins*, which are usually dense, with closely packed, scale-like bracts, rarely loose, or with minute deciduous scales. Stamens in the male catkins 2 or more (rarely united into 1) within each scale, usually accompanied by 2 or more smaller scales, either distinct or forming in a few cases an irregular or oblique perianth, or rarely entirely deficient. Female catkins either like the males, with 1, 2, or 3 flowers within each scale, or reduced to a sessile bud, with 2 or 3 flowers in the centre, surrounded by the lower empty scales of the catkin; within each scale are also usually 2 or 3 inner scales. Perianth none, or closely combined with the ovary, with a minute, free, entire or toothed border. Ovary 1-celled or several-celled, with 2 or more styles, always resulting in a 1-celled fruit, which is either a 1-seeded nut, or a several-seeded capsule opening in 2 valves. The catkin-scales, or the inner scales, or both, usually persist, and are sometimes enlarged into an involucre, either around or under the fruit. Seeds without albumen, at least in the British genera.

An extensive family, widely distributed over the globe, but chiefly in the temperate regions of both hemispheres, where it often constitutes a large proportion of the forest trees. Minor differences, chiefly in the female flowers, have induced its division into several tribes, often considered as independent families, but as a whole it forms a natural as well as a distinct group. Among the few British plants that have their inflorescence at all resembling catkins, *Hippophae* is readily distinguished by the berry-like fruits and scurfy foliage, *Elms* by their hermaphrodite flowers, and *Conifers* by their peculiar foliage independently of the important character of the naked seeds.

Tree or shrub, in flower.

Scales of the male catkins broad, imbricated. Anthers longer than their filaments.

Male and female catkins short, sessile, and erect . . . 1. GALE.

Male catkins cylindrical, usually pendulous.

Three distinct flowers, each with 4 stamens, under each scale of the male catkin. Female catkins small, ovoid 2. ALDER.

Stamens 6 to 12 within each scale, not in distinct flowers.

Scales of the male catkins stalked. Female catkins cylindrical 3. BIRCH.

Scales of the catkins sessile.

Stamens at the base of the scale. Female catkins loose, with narrow scales 4. HORNBEAM.

Stamens on the scale itself. Female catkins sessile and bud-like 5. HAZEL.

Scales of the male catkins narrow-linear, or divided, or very minute. Anthers small, on slender filaments.

Flowers diœcious. Catkins, both male and female, cylindrical, compact, and usually silky-hairy.

Catkin-scales entire. Stamens 2, rarely 3 to 5, with 1 or 2 gland-like inner scales 8. WILLOW.

Catkin-scales jagged. Stamens several, in an oblique, cup-shaped perianth 9. POPLAR.

Flowers monœcious.

Male catkins slender and interrupted. Female flowers in small, sessile or shortly-stalked clusters 7. OAK.

Male catkins globular, on pendulous stalks. Females erect, globular, softly hairy 6. BEECH.

Tree or shrub, in fruit.

Capsules (in catkins) opening in 2 valves. Seeds minute, with a tuft of long, cottony hairs.

- Scales of the catkin entire. Leaves on short or rather stiff stalks 8. WILLOW.
- Scales of the catkin jagged. Leaves on long stalks, very broad, shaking with wind 9. POPLAR.
- Nuts 1-seeded.
- Nuts small, in compact catkins.*
- Nuts slightly succulent, and resinous outside . . . 1. GALE.
- Nuts flat and quite dry.
- Scales of the catkins thin and deciduous. Nuts winged 3. BIRCH.
- Scales of the catkins hard, remaining after the nuts have fallen 2. ALDER.
- Nuts solitary, or in clusters, or in loose spikes, wholly or partially enclosed in an involucre.*
- Nuts small, in loose spikes, each in a 3-lobed, leafy involucre 4. HORNBEAM.
- Nuts solitary or clustered, each in an involucre, adhering to it at the base, with leafy, jagged lobes . . . 5. HAZEL.
- Nuts (acorns) projecting from a short, cup-shaped involucre 7. OAK.
- Nuts completely enclosed in a prickly involucre . . . 6. BEECH.

Among trees generally planted in Britain, belonging to exotic genera of the *Catkin* family, or nearly allied to, it are the *Spanish Chestnut* (*Castanea*), with the flowers nearly of an *Oak*, but the nuts completely enclosed in a prickly involucre, as in *Beech*; two or three species of *Plane* (*Platanus*), with both male and female catkins globular and pendulous, the flowers intermixed with bristly hairs, and differing slightly from the family in their albuminous seeds; the *Liquidambar*, with globular catkins, but in the structure of its ovary and fruit showing more affinity to some families allied to the *Saxifrages*; and two or three species of *Walnut* (*Juglans*), which in their pinnated leaves and more perfect perianth show an approach to the *Sumach* family (*Terebinthaceæ*).

I. GALE. MYRICA.

Shrubs, with resinous, dotted leaves. Flowers diœcious, in short, sessile catkins; the scales imbricated, without inner scales. Male catkins with 4 or 8 stamens within each scale, the anthers nearly sessile, and no perianth. Females with 2 ovaries under each scale; perianth adhering to the base of the ovary, with 2 lateral, projecting lobes. Stigmas 2, linear. Fruit a small, resinous or nearly drupe-like, globular nut, with 1 erect seed.

A genus of several species, dispersed over the temperate regions of the globe, or the mountainous parts of the tropics. Associated with

two or three small North American or South African genera, it forms a distinct tribe approaching *Hippophae* in the 2-lobed female perianth and almost drupe-like nut.

1. Sweet Gale. *Myrica Gale*, Linn. (Fig. 902.)

(Eng. Bot. t. 562.)



Fig. 902.

An erect shrub, of 2 or 3 feet, fragrant when rubbed. Leaves deciduous, cuneate-oblong or lanceolate, slightly toothed towards the top, and often rather downy underneath. Catkins sessile along the ends of the branches; the males scarcely 6 lines long, with spreading, concave, shining scales; the females much shorter, the long styles protruding from the scales. Fruiting catkins somewhat lengthened; the globular, resinous nuts scarcely above a line in diameter.

In bogs and wet moors in northern and Arctic Europe, Asia, and America. Abundant in Scotland, northern England, and Ireland, rarer in the south and east of England. *Fl. spring, before the leaves are out.*

II. **ALDER.** *ALNUS.*

Flowers monœcious, the males in cylindrical catkins, usually pendulous, with broad, almost sessile scales. Stamens 12 within each scale, the anthers on very short filaments, with a small scale under each, usually forming 3 distinct, nearly regular, 4-cleft perianths. Female catkins short, closely imbricated; the scales entire, with 2, rarely 3, smaller inner scales. Ovaries 2 within each scale, 2-celled, with a pendulous ovule in each cell. Styles 2. Fruiting catkin ovoid, the scales (formed of the catkin-scale, with the 2 inner ones combined), hard, almost woody, remaining after the nuts have fallen. Nuts small and seed-like, without wings.

A small genus, confined to the northern hemisphere, closely connected with the *Birches* through some intermediate exotic species.

1. Common Alder. *Alnus glutinosus*, Linn. (Fig. 903.)

(*Betula Alnus*, Eng. Bot. t. 1508.)

A moderate-sized tree, of a dark hue. Leaves stalked, broadly ovate or orbicular, sharply toothed, and occasionally lobed, glabrous, or with a little down in the axils of the veins on the under side. Catkins 2 or 3 together, in terminal clusters or small panicles; the males long, loose, and drooping; the females not half an inch long, with the styles slightly protruding. In the fruiting catkin the scales are not unlike those of a miniature fir-cone.



Fig. 903.

In wet woods, and borders of streams, and wet pastures, in Europe and western Asia, not extending to the Arctic Circle. Abundant in Britain. *Fl.* early spring, before the leaves are fully out, the catkins having been formed the previous autumn.

III. BIRCH. BETULA.

Flowers monceecious, the males in cylindrical catkins, usually pendulous, with broad, shortly stalked scales. Stamens 8 to 12 within each scale, the anthers on very short filaments, the cells distinct, some with a small scale underneath, and all irregularly arranged in 3 flowers. Female catkins cylindrical and compact, each scale with 2 small scales inside, and 3 or rarely more flowers. No perianth. Ovary flat, with 2 styles and 2 cells, with a pendulous ovule in each. In the fruiting catkin the scales (formed of the catkin-scale, with the 2 inner ones combined) are somewhat enlarged, and 3-lobed, falling off with the nuts, which are small and seed-like, flat, surrounded by a scarious wing.

A small genus, confined to the northern hemisphere, and not reaching the tropics.

Tree, with broadly ovate, usually pointed leaves 1. *Common B.*
Shrub, with small, orbicular leaves 2. *Dwarf B.*

1. Common Birch. *Betula alba*, Linn. (Fig. 904.)

(Eng. Bot. t. 2197. *B. glutinosa*, Bab. Man.)

An elegant tree, with slender, often gracefully drooping branches,

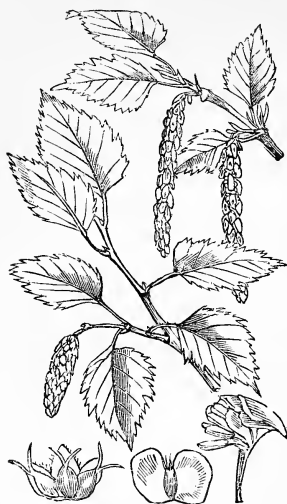


Fig. 904.

the white bark of the trunk readily peeling off in layers. Leaves usually broadly ovate, taper-pointed, and toothed, but varying from rhomboidal to triangular or broadly cordate, often trembling on their slender stalks like those of the *Aspen*, glabrous and shining, with minute glandular dots when young. Male catkins drooping, 1 to 2 inches long; the females shortly stalked, about 6 lines long when in flower. Fruiting catkins 1 to $1\frac{1}{2}$ inches, the scales wedge-shaped, full 2 lines long, broadly 3-lobed.

In woods, in northern and central Europe, Russian Asia, and North America, more limited to mountain districts in southern Europe. Extends all over Britain. *Fl. spring, before the leaves are fully out.*

2. Dwarf Birch. *Betula nana*, Linn. (Fig. 905.)

(Eng. Bot. t. 2326.)



Fig. 905.

Usually a small shrub, but when left to itself will form a tree of 20 feet. Leaves very shortly stalked, nearly orbicular, seldom above half an inch long, and not pointed. Catkins small and sessile, the males oblong or shortly cylindrical, the females scarcely above 3 lines long. Fruiting catkins about 6 lines long, the scales not so thin, nor falling off so readily as in the *common B.*

In moors and bogs, in northern Europe, Asia, and America, and in the great mountain-chains of central Europe and Asia. Not uncommon in the Highlands of Scotland, but rare in the north of England, and unknown in Ireland. *Fl. spring.*

IV. **HORNBEAM.** CARPINUS.

Flowers monœcious, the males in cylindrical catkins, with broad, sessile scales. Stamens about 12 within each scale, without inner scales or perianth; the anther-cells distinct, on very short, forked filaments. Female catkins slender and loose, the scales lanceolate and deciduous. Flowers 2 within each scale, each one enclosed in a hairy, unequally 3-lobed inner scale. Perianth combined with the ovary at the base, with a minute toothed border. Ovary 2-celled, with a pendulous ovule in each cell. Styles 2. Fruiting catkin much elongated, the inner scales enlarged into long, leafy, unequally 3-lobed bracts, each enclosing at its base a small nut.

There are but very few European, Asiatic, or North American species, differing slightly from each other in the shape of the fruiting bracts.

1. **Common Hornbeam.** *Carpinus Betulus*, Linn. (Fig. 906.)

(Eng. Bot. t. 2032.)

A small tree, with numerous short, slender branches. Leaves stalked, ovate, pointed, doubly toothed, with parallel veins diverging from the midrib, usually downy in their axils underneath. Male catkins sessile, about $1\frac{1}{2}$ inches long, less drooping than in the allied genera; the anthers crowned by little tufts of hairs. Female catkins slender, the fruiting ones often several inches long, and conspicuous for their long, leaf-like bracts; the central lobe lanceolate, 1 to $1\frac{1}{2}$ inches long. Nut small, ovoid, with prominent ribs.



Fig. 906.

In central and south-eastern Europe, extending eastward to the Caucasus and northwards to southern Sweden. In Britain, it was formerly much planted in shrubberies, and is believed to be truly indigenous in some parts of eastern England. *Fl. spring, as the leaves come out.*

V. **HAZEL.** CORYLUS.

Flowers monœcious, the males in cylindrical catkins, with broad,
VOL. II. U

sessile scales, each with 2 small lobes or adherent scales inside. Stamens about 8, irregularly inserted on the scale itself, without any perianth; the anther-cells distinct, on very short, forked filaments. Female catkins very small, forming a sessile bud, with closely packed, narrow scales, the outer ones empty. Flowers 2 within each scale, crowded in the upper part of the catkin, each one enclosed in a minute, jagged inner scale. Perianth combined with the ovary at the base, with a minute, toothed border. Ovary 2-celled, with a pendulous ovule in each cell. Styles 2. Fruits usually clustered, each consisting of a hard nut, nearly enclosed in a leafy involucre, unequally lobed and jagged, formed of the very much enlarged inner scales of the catkin.

A genus of but very few species, spread over the temperate regions of the northern hemisphere.

1. **Common Hazel.** *Corylus Avellana*, Linn. (Fig. 907.)

(Eng. Bot. t. 723. *Nut. Hazel-nut. Cob-nut. Filbert.*)



Fig. 907.

A shrub, or sometimes a small tree. Leaves broadly obovate or orbicular, doubly toothed or slightly lobed, coarse and downy on both sides. Male catkins drooping, $1\frac{1}{2}$ to 2 inches long, the females resembling small leaf-buds, with shortly protruding, red stigmas. After flowering the minute inner bracts enlarge very rapidly, so as to form the leafy involucre commonly called the *husk* of the nut.

In woods and thickets, throughout Europe and central and Russian Asia, except the extreme north. Abundant in Britain. *Fl.* early spring, before the leaves are out.

VI. **BEECH.** FAGUS.

Flowers monœcious, the males in globular, pendulous catkins; the scales small, and falling off very early. Perianth campanulate, shortly stalked, 4- to 6-lobed (formed of the inner scales under each catkin-scale), containing 8 to 12 stamens, with long protruding filaments and

small anthers. Female catkins globular, almost sessile, the scales linear, with numerous, closely packed, filiform inner scales, all empty except the uppermost, and forming an involucre round 2 or 3 flowers, sessile in the centre of the catkin. Perianth combined with the ovary at its base, bordered by 4 or 5 short lobes. Ovary 3-celled, with 2 pendulous ovules in each cell. Styles 3. Nuts 2 or 3, enclosed in a hard, prickly involucre, composed of the combined outer and inner scales of the catkin, and opening in 4 valves.

Besides the single northern genus, the species comprises several from Antarctic America.

1. **Common Beech.** *Fagus sylvatica*, Linn. (Fig. 908.)

(Eng. Bot. t. 1846.)

A tall tree, with a straight, smooth trunk, and large, dense head. Leaves shortly stalked, ovate, entire or obscurely toothed, silky when young, glabrous when full-grown. Catkins or flower-heads softly silky-hairy, the males 4 to 6 lines diameter, on slender, drooping peduncles 1 to 1½ inches long, consisting of about a dozen flowers. Female catkins nearly as large, but on a very short, erect peduncle. Fruiting catkin about ¾ inch diameter; the prickles rather soft and silky, containing 2 or 3 triangular nuts, commonly called *mast*.

In temperate Europe, extending eastward to the Caucasus and northward into southern Scandinavia, becoming rather a mountain plant in southern Europe. Extensively planted in Britain, establishing itself readily as a naturalized tree, and believed to be truly indigenous in the flatter districts of England. *Fl. spring*.



Fig. 908.

VII. **OAK.** *QUERCUS*.

Flowers monœcious, the males in slender, pendulous catkins or spikes, usually interrupted, without any or with only very small catkin-scales. Stamens 6 to 12, with slender filaments, surrounded by about as many narrow scales, sometimes united into an irregular pe-

rianth. Female flowers solitary or clustered, each one surrounded by an involucre of small imbricated scales. Perianth adherent to the ovary at its base, with a short, toothed border. Ovary 3-celled, with 2 pendulous ovules in each cell. Style 3-lobed. Nut or *acorn* oblong, ovoid, or globular, protruding from a woody cup or involucre formed by the enlarged scales.

A very numerous genus, extending over nearly the whole of the northern hemisphere, excepting the extreme north, but only penetrating into the tropics along the chain of the Andes or in the Moluccas. Many exotic species have evergreen or entire leaves, or are mere shrubs, but are all readily recognized by the fruit, in which the involucre never so completely encloses the nut as in the *Chestnut* and *Beech*. Among the most frequent in our plantations may be mentioned the *evergreen* or *Ilex* O. (*Q. Ilex*), from southern Europe, the *Turkey* or *moss-cupped* O. (*Q. Cerris*), from south-eastern Europe, the *red* O. (*Q. rubra*), and some others, from North America.

1. British Oak. *Quercus Robur*, Linn. (Fig. 909.)

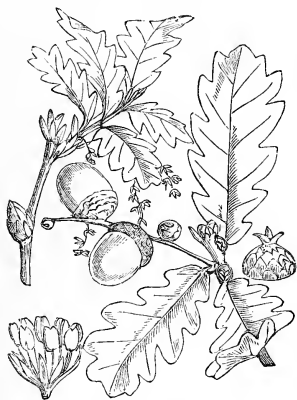


Fig. 909.

A stately tree, the longest-lived among the natives of our islands. Leaves deciduous, although in some varieties they will remain through a great part of the winter, usually obovate or oblong, irregularly sinuate or almost pinnatifid; the lobes usually obtuse, glabrous or (rarely in Britain) downy underneath. Cup very much shorter than the acorn, with short, obtuse, closely imbricated, often scarcely distinct scales.

Extends over the whole of Europe, except the extreme north, penetrating along the chain of the Caucasus a considerable way into central Asia, although further north it does not cross the Ural.

Fl. spring as the leaves are coming out.

It varies considerably in foliage and inflorescence, and throughout its range two remarkable forms appear so definite and usually so permanent that many of the most acute botanists regard them as distinct species. The question of their specific identity has been much discussed, but the arguments adduced on each side are too long to be here entered into, nor are they absolutely conclusive in favour of the view here adopted, which is nevertheless the result of a close investigation, carried on for many years in various parts of Europe. The following are the two British races:—

a. *Pedunculate British O.* (*Q. Robur pedunculata*, Eng. Bot. t. 1342.) Leaves sessile or shortly stalked. Fruits either clustered or spiked, above the middle of a peduncle varying from 1 to 5 or even 6 inches long. The commonest Oak over the greater part of England and the lowlands of Scotland. In the hilly parts of the west and north it is less abundant and less constant in its characters, and sometimes wholly wanting.

b. *Sessile British O.* (*Q. Robur sessiliflora*, Eng. Bot. t. 1845.) Leaves on footstalks varying from $\frac{1}{2}$ to 1 inch long. Fruits solitary or clustered, either closely sessile on the branch or borne on a short peduncle, very rarely attaining an inch. Frequently scattered in woods of the pedunculate variety, and then pretty constant in its characters, rarely constituting the mass of oak-woods in the lower parts of Britain, but in North Wales and the hilly parts of northern England it is the commonest of the two, and very much more variable.

VIII. **WILLOW.** SALIX.

Leaves variable, but not triangular nor rhomboidal. Stipules often very conspicuous, but sometimes small or deficient on other branches of the same plant. Flowers diœcious, in cylindrical, usually silky-hairy catkins, with small, entire scales. Stamens in the males 2, rarely 3, 5, or even more, or united into one, with slender filaments and small anthers, and a gland-like scale either between the stamens and the axis, or more rarely between the stamens and the catkin-scale, or two scales, one on each side, but no perianth. Female flowers solitary within each scale, with a gland-like inner scale between the ovary and the axis. Ovary conical, sessile or stalked, one-celled, with several ovules inserted on 2 short parietal placentas. Style forked, each lobe entire or shortly 2-lobed. Fruit a conical capsule, opening in 2 valves. Seeds several, minute, with a tuft of long, white, silky hairs.

A vast genus, widely spread over the world, but particularly abundant in the northern hemisphere, from the tropics to the Arctic zone, ascending high upon alpine summits, and in low countries chiefly inhabiting wet or sandy situations. The great variations in the shape of the leaves of many species, and the difficulty of matching the male and female specimens, or the young and old leaves of those species which flower before the leaves are out, have produced a multiplication of supposed species, and a confusion in their distinction, beyond all precedent. The following fifteen are all that appear to be truly distinct among the British ones; at the same time, reliable observations are wanting on the degree of variation of particular characters, especially

amongst the mountain species, and it is certain that apparently intermediate forms between very dissimilar species are not unfrequent in herbaria. These are in some cases taken from trees or shrubs much altered by cultivation, in others they may be, as asserted by several recent observers, natural hybrids; in neither case can they be considered as botanical species.

Male catkins sessile. Females sessile or on very short peduncles, with or without leafy bracts.

Stamen 1 within each scale, entire or forked. Leaves narrow, glabrous or whitish underneath. Anthers usually purple 5. *Purple W.*

Stamens 2, distinct. Anthers usually yellow.

Leaves very silky and white, at least underneath.

Stems erect, twiggy. Leaves long, lanceolate or linear 6. *Osier W.*

Stems creeping underground. Leaves small, ovate, oblong or lanceolate 10. *Creeping W.*

Leaves glabrous, downy or cottony.

Leaves wrinkled, usually with a short crisp or cottony down, especially underneath. Capsules pedicellate.

Male catkins very silky, oblong. Capsules 3 to 4 lines long. Leaves ovate or oblong 7. *Sallow W.*

Male catkins cylindrical, rather silky. Capsules 2 to 3 lines long. Leaves mostly obovate 8. *Round-eared W.*

Leaves not wrinkled, glabrous or downy when young. Catkins rather slender. Capsules pedicellate 9. *Tea-leaved W.*

Leaves not wrinkled, downy or woolly, quite entire.

Catkins dense and very silky hairy. Capsules sessile.

Catkins silky, white. Capsules about 2 lines long 11. *Downy W.*

Catkins golden-yellow. Capsules about 3 lines long 12. *Woolly W.*

Male and female catkins on short, leafy shoots.

Trees or tall shrubs.

Stamens about 5. Leaves dark-green and shining 1. *Bay W.*

Stamens 3. Leaves green above, white underneath 4. *Almond W.*

Stamens 2.

Leaves ashy-grey or silky white. Capsules nearly sessile 3. *Common W.*

Leaves green or glabrous. Capsules pedicellate 2. *Crack W.*

Low, spreading or prostrate, or creeping shrubs.

Catkins at the end of short, leafy shoots, without

- buds. Stems procumbent, ascending, or forming low bushes.
- Leaves slightly toothed. Male catkins nearly sessile. Capsules pedicellate 9. *Tea-leaved W.*
- Leaves finely toothed. All the catkins on leafy stalks. Capsules almost sessile 13. *Whortle W.*
- Catkins on short peduncles, at the last leaf of a branch, with a bud in the angle. Stems prostrate or creeping.
- Leaves entire, wrinkled, white underneath . . . 14. *Reticulate W.*
- Leaves finely toothed, not wrinkled, green on both sides 15. *Dwarf W.*

The well-known *weeping W.* (*S. babylonica*) is of Asiatic origin. The *S. daphnoides*, from continental Europe, with the male catkins like those of the *Sallow W.*, but with lanceolate, pointed, green or glaucous leaves, is occasionally planted, and has been seen apparently wild, near Cleveland in Yorkshire; and some other Continental or North American species have been described as British from planted specimens. Most, if not all, of the British species are said to be also natives of North America.

1. Bay Willow. *Salix pentandra*, Linn. (Fig. 910.)

(Eng. Bot. t. 1805.)

A shrub or small tree, from 6 to 20 feet high, glabrous or rarely slightly silky on the young shoots, the twigs green or yellow. Leaves broadly lanceolate or oblong, pointed, finely toothed, thicker, and more smooth and shining than in any other species. Catkins cylindrical and loose, on short, lateral, leafy shoots; the males $1\frac{1}{2}$ to 2 inches long, less hairy than in most species. Stamens usually 5 but sometimes more, and there are almost always 2 or even more entire or divided gland-like scales at their base. Ovaries glabrous, nearly sessile or stalked. Capsules 2 to 3 lines long, of a yellowish-green.



Fig. 910.

In damp, open woods, and along streams, chiefly in hilly districts, extending all over Europe and Russian Asia to the Arctic regions. In Britain, chiefly in northern England, southern Scotland, and Ireland. *Fl. spring, rather late.*

2. Crack Willow. *Salix fragilis*, Linn. (Fig. 911.)

Eng. Bot. t. 1807, *S. Russeliana*, t. 1808, *S. decipiens*, t. 1937.)



Fig. 911.

Very near the *common W.*, but usually a more bushy though equally large tree, and the foliage green and glabrous, or very slightly silky when young; the catkins are rather longer and looser, the flowers larger, the capsules more distinctly pedicellate and much more tapering at the top.

Widely distributed, like the *common W.*, over Europe and Russian Asia, and extensively cultivated, with nearly the same geographical limits. In Britain, believed to be indigenous in England, Ireland, and southern Scotland. *Fl. spring.*

3. Common Willow. *Salix alba*, Linn. (Fig. 912.)

(Eng. Bot. t. 2430. *S. carulea*, t. 2431.)

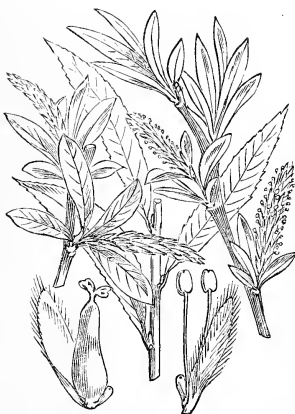


Fig. 912.

A tree of considerable height, the foliage of an ashy-grey or whitish colour; the young twigs green, purplish, or bright yellow. Leaves mostly narrow-lanceolate, pointed and toothed, but not so finely as in the *Bay W.*, and when young silky white on both sides, or at least underneath, often glabrous when old but never of a bright green. Catkins cylindrical and loose, on short, lateral shoots or leafy peduncles. Stamens always 2, usually with 2 glandular scales. Capsule glabrous, sessile or nearly so, shortly tapering at the top.

In moist meadows, and hedgerows, in marshes, along streams, etc., throughout Europe and Russian Asia, except the extreme north, and extensively planted. Common in Britain. *Fl. spring.* The *golden Osier* (*S. vitellina*, Eng. Bot. t. 1389) is a variety of this tree, with bright-yellow branches, cultivated as an Osier.

4. **Almond Willow.** *Salix amygdalina*, Linn. (Fig. 913.)

(Eng. Bot. t. 1936, *S. triandra*, t. 1435, *S. lanceolata*, t. 1436.)

A moderate-sized tree, often flowering as a shrub. Leaves rather narrow, lanceolate, either paler or more frequently nearly white underneath, but not silky. Catkins cylindrical and loose, on very short, leafy shoots, like those of the *common W.*, but in the males there are always 3 stamens under each scale, and in the females the scales are more persistent, remaining often till the fruit is ripe. Capsules seldom 2 lines long, glabrous, usually pedicellate, and but little tapering at the top.

In moist or marshy places, in hedges, etc., all over Europe and Russian Asia, except the extreme north, and much cultivated for basket-making. Frequent in some parts of southern England and Ireland. *Fl. spring.*



Fig. 913.

5. **Purple Willow.** *Salix purpurea*, Linn. (Fig. 914.)

(Eng. Bot. t. 1388, *S. Helix*, t. 1343, *S. Forbyana*, t. 1344, *S. rubra*, t. 1145, *S. Lambertiana*, t. 1359.)

A shrub, decumbent at the base, or a small tree; the branches twiggy, glabrous, yellow, green, or purple. Leaves usually long and narrow, varying to oblong, green and glabrous above, usually whitish or slightly silky underneath. Catkins appearing before the leaves, the males at least closely sessile along the twigs, with only very small bracts at the base, narrow-cylindrical but closely packed, seldom an inch long when in flower, shortly silky; the scales short, obtuse, and tipped with purple. Stamens united into an entire filament with a double anther, or the filament forked, with an anther on each branch. Capsules cottony-white, 1 to $1\frac{1}{2}$ lines long,



Fig. 914.

usually sessile, and very obtuse. The female catkins, especially when in fruit, are sometimes shortly stalked, with a few leafy bracts at their base.

In marshy places, and on river-banks, in temperate and southern Europe, extending across Russian Asia, and northwards to southern Scandinavia; some varieties cultivated as Osiers. Spread over England, Ireland, and southern Scotland. *Fl. early spring*. The broader-leaved varieties, commonly designated as *S. purpurea* or *S. Helix*, appear to be the most common, the narrower-leaved *S. rubra* chiefly cultivated.

6. Osier Willow. *Salix viminalis*, Linn. (Fig. 915.)

(Eng. Bot. t. 1898, *S. stipularis*, t. 1214. *Common Osier*.)



Fig. 915.

A shrub, with long, twiggly branches, usually slightly downy, sometimes growing into a small tree. Leaves long and narrow, often 4 or 5 inches, of a silvery white underneath, with the silky down more copious than in any other long-leaved species. Catkins cylindrical, sessile or nearly so, with a few bracts at the base, an inch long or rather more, with rather long, silky hairs. Stamens 2, as in all the following species. Capsules downy, about 2 lines long, tapering towards the top.

In wet places, along streams, etc., throughout Europe and Russian Asia, except the extreme north, and the most commonly cultivated Osier. Frequent in Britain. *Fl. spring*. The *S. Smithiana*, Willd. (*S. mollissima*, Eng. Bot. t. 1509), is a rather broader-leaved variety, with the capsules more distinctly pedicellate.

7. Sallow Willow. *Salix Caprea*, Linn. (Fig. 916.)

(Eng. Bot. t. 1488, *S. sphacelata*, t. 2333, *S. cinerea*, t. 1897, *S. aquatica*, t. 1437, *S. oleæfolia*, t. 1402, and probably *S. acuminata*, t. 1434. *Common Sallow*. *English Palm*.)

A tall shrub or bushy tree. Leaves ovate or oblong, often rather large, seldom tapering at the top, either narrowed, rounded, or broadly cordate at the base, usually of a greyish green, more or less wrinkled, and whitish underneath with a short crisped down, not silky, entire or toothed, especially when old. Stipules usually conspicuous, broad and

oblique. Catkins sessile, the males usually closely so, with a few broad, scale-like bracts at the base, oblong-cylindrical, an inch long or rather more, and very silky-hairy; the females not quite so close; the bracts often more leafy, and when in fruit 2 inches long or more. Capsules downy-white, pedicellate, 3 or 4 lines long, tapering into a long beak.

In woods, thickets, and edges, along streams, etc., throughout Europe and Russian Asia to the Arctic Circle. Common in Britain. *Fl. early spring*. It varies very much in the size and shape of the leaves, the amount of down, etc., but generally distinguished from all the preceding species by the cottony, not silky, down, and wrinkled leaves, from most of the following by its larger size. The *grey Sallow* (*S. cinerea*, Linn.) is distinguished by some as being more downy, by others as less so, with the leaves usually smaller, and the catkins not quite so thick and silky.



Fig. 916.

8. Round-eared Willow. *Salix aurita*, Linn. (Fig. 917.)

(Eng. Bot. t. 1487.)

Allied to the *Sallow W.* and perhaps a variety, but more bushy; the leaves smaller, usually obovate, about an inch long, but varying from orbicular to oblong, and then often 2 inches long; they are also more wrinkled than in the *Sallow*, waved on the edges, grey and downy, especially on the under side; the stipules very conspicuous. Male catkins closely sessile but much smaller than in the *Sallow*, and the silky hairs less prominent; the females about half an inch long when in flower, an inch when in fruit, on a short stalk, with small leafy bracts. Capsules pedicellate, 2 to 3 lines long, tapering at the top.

In woods and thickets, in Europe and



Fig. 917.

Russian Asia, from the Mediterranean to the Arctic regions. Common in Britain. *Fl. early spring.*

9. Tea-leaved Willow. *Salix phylicifolia*, Linn. (Fig. 918.)
(Eng. Bot. t. 1146, 1213?, 1390, 1403, 1404, 1958, 2186, 2342, 2343, and 2344.)

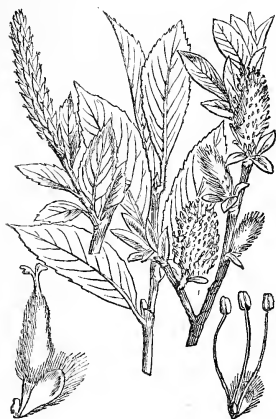


Fig. 918.

A bushy shrub, very variable in its foliage, some of the larger forms coming very near the *Sallow*, whilst the smaller ones appear to pass gradually into the *whortle W.* Young shoots and leaves often downy, when old usually glabrous. Leaves ovate-oblong or rarely lanceolate, usually 1 to 2 inches long, and pointed, not wrinkled, but the veins rather prominent above, often toothed at the edge, and glaucous or whitish underneath, but not closely silky. Catkins more slender and less silky than in the *Sallow*; the males nearly sessile, with a few broad, or sometimes leafy bracts at the base; the females more stalked, with the bracts more leafy, usually under an inch long when in

flower, 1 to 2 inches when in fruit. Capsules shortly stalked, glabrous or silky or cottony-white, 2 to near 3 lines long when ripe.

In woods, thickets, and waste places, near streams, in northern and Arctic Europe and Asia, and in the mountain districts of central and southern Europe. In Britain, chiefly in northern England, in Scotland, and probably in Ireland. *Fl. spring and early summer.* Among the numerous varieties published as species, often from specimens transplanted from their native stations and altered by cultivation, two forms are generally recognized as distinct types, *S. nigricans*, which always turns black in drying and is usually larger, and *S. phylicifolia*, which preserves its colour better and has usually a smaller and neater foliage.

10. Creeping Willow. *Salix repens*, Linn. (Fig. 919.)

(Eng. Bot. t. 183, *S. argentea*, t. 1364, *S. arbuscula*, t. 1366, *S. prostrata*, t. 1959, *S. fusca*, t. 1960, *S. parvifolia*, t. 1961, *S. adscendens*, t. 1962.)

A low, straggling shrub; the stems creeping extensively underground and rooting at the base, ascending to the height of about a foot

or more, erect and taller when cultivated in rich soils; the foliage and young shoots more or less densely silky-white. Leaves oblong or lanceolate, under an inch long, rarely shortly ovate, or in luxuriant shoots narrow-oblong, $1\frac{1}{2}$ inches long, usually entire or nearly so, and silky on both sides. Catkins cylindrical, usually about 6 lines long, and sessile when in flower, with a few leafy bracts at the base; when in fruit the peduncle lengthens, and the catkin often attains an inch. Capsules pedicellate, usually silky, seldom 2 lines long.

On heaths, moors, and sandy places, in Arctic, northern, and central Europe, and Russian Asia, more rare in southern Europe. Common in Britain. *Fl. spring.* Varieties rather less creeping, with the leaves somewhat wrinkled, and the white down rather more cottony, distinguished under the names of *S. ambigua* or *S. versifolia*, showing in some respects a connection between the *round-eared W.* and the *creeping W.*, are asserted by German botanists to be accidental hybrids between those two species.



Fig. 919.

11. Downy Willow. *Salix Lapponum*, Linn. (Fig. 920.)

(*S. arenaria*, Eng. Bot. t. 1809, *S. glauca*, t. 1810, *S. Stuartiana*, t. 2586.)

A spreading, much branched shrub, usually low and scrubby, sometimes attaining 2 or 3 feet or even more when it descends into rich valleys. Leaves oblong or lanceolate, pointed, and entire, covered on both sides with a white cottony down, or, when old, becoming nearly glabrous above. Catkins closely sessile, with a few deciduous bracts at their base; when in flower about an inch long, thick, with long, dense, silky hairs; when in fruit lengthening to $1\frac{1}{2}$ or 2 inches. Capsules sessile, cottony, about 2 lines long.

In mountain pastures, and wet, bushy places, in northern and Arctic Europe,



Fig. 920.

and Asia, and in the mountains of central Europe. In Britain, only in the Highlands of Scotland. *Fl. summer*. It varies much in stature and the size of the leaves, but is always distinguished from the *creeping W.* by the stem not creeping underground, and the much larger catkins, more like those of the *Sallow W.*, and from the latter species by the entire leaves and sessile capsules.

12. Woolly Willow. *Salix lanata*, Linn. (Fig. 921.)

(Eng. Bot. Suppl. t. 2624.)



Fig. 921.

A stout, much branched shrub, attaining about 2 feet in height, allied to the *downy W.*, but the leaves are usually ovate, covered on both sides with a thick, soft, silky wool, and the catkins longer, clothed with dense, long, silky hairs, of a fine golden-yellow; when in fruit they attain near 3 inches in length. Capsules sessile, cottony, tapering at the top, more than 3 lines long.

A high northern and Arctic species, both in Europe and Asia. Very local in Britain, and only in a few rocky glens in the eastern Grampians in Scotland. *Fl. early summer*.

13. Whortle Willow. *Salix myrsinites*, Linn. (Fig. 922.)

(Eng. Bot. t. 1360, *S. procumbens*, Suppl. t. 2753.)



Fig. 922.

A low, scraggy, much branched shrub, sometimes closely procumbent, though not creeping underground, sometimes rising to the height of a foot or more. Leaves small, orbicular, ovate or lanceolate, bright green, with prominent veins, and finely toothed; usually with long, silky hairs when young, becoming glabrous when old. Catkins loosely cylindrical, $\frac{1}{2}$ to 1 inch long in flower, $1\frac{1}{2}$ to 2 inches when in fruit, always borne

on short, leafy shoots or peduncles. Capsules nearly sessile, about 2 lines long, more or less hairy.

In the mountains of northern and Arctic Europe and Asia, and at considerable elevations in the Alps and Pyrenees. In Britain, only in the Scotch Highlands, and in the mountains of Sligo in Ireland. *Fl. early summer*. Under the name of *S. arbuscula* the British Floras include the plants figured in Eng. Bot. t. 1361, 1362, 1363, and 2341, which appear to be either varieties of the *whortle W.*, of rather larger growth, with short peduncles to the catkins, and the leaves rather glaucous underneath, or perhaps in some instances small-leaved varieties of the *tea-leaved W.*, showing in their more toothed leaves and more leafy peduncles an approach to the *whortle W.*

14. Reticulate Willow. *Salix reticulata*, Linn. (Fig. 923.)

(Eng. Bot. t. 1908.)

A prostrate, much branched shrub, often spreading to a considerable extent, but not rising above 5 or 6 inches from the ground; the branches glabrous or hairy when young. Leaves obovate or orbicular, quite entire, $\frac{3}{4}$ to 1 inch long and broad, green, glabrous, and much wrinkled above, white underneath. Catkins on rather long, leafless peduncles, at the ends of short branches, opposite to the last leaf; both males and females cylindrical, $\frac{1}{2}$ to 1 inch long, shortly downy but not silky-hairy. Capsules cottony, about $1\frac{1}{2}$ lines long.



Fig. 923.

In the mountains of northern and Arctic Europe, Asia, and America, and at considerable elevations in the great mountain-ranges of central Europe and Russian Asia. In Britain, probably confined to the Scotch Highlands. *Fl. summer*.

15. Dwarf Willow. *Salix herbacea*, Linn. (Fig. 924.)

(Eng. Bot. t. 1907.)

The smallest of British shrubs, the half-underground stems creeping and rooting sometimes to a considerable extent, the branches seldom rising above 2 inches from the ground. Leaves obovate or orbicular, about half an inch long, finely crenated, green, glabrous, and veined like those of the *whortle W.*, or sometimes slightly silky-hairy when young. Catkins very small, ovoid, and few-flowered, on very short,



Fig. 924.

leafless peduncles, or almost sessile, opposite the last leaf of the young shoots. In fruit they sometimes attain half an inch. Capsules nearly glabrous, full 2 lines long.

In alpine pastures, in northern and Arctic Europe and Asia, and in the Alps and Pyrenees. Common at high elevations in the mountains of Scotland, extending into northern England, North Wales, and northern Ireland, and Glengariff in the south. *Fl. summer.*

IX. POPLAR. *POPULUS*.

Leaves usually broadly triangular or nearly orbicular, on slender stalks; the scales of the leaf-buds often covered with a resinous varnish. Catkins cylindrical, usually silky-hairy, the scales irregularly toothed or lobed at the top. Perianth (or inner united scales) a small, flat, oblique cup. Stamens in the males from about 8 to near 30, with slender filaments and small anthers. Ovary in the females 1-celled, with several ovules inserted on short, parietal placentas. Styles 2, with deeply forked stigmas. Fruit a capsule, opening in 2 valves. Seeds several, minute, with a tuft of long, silky hairs.

A small genus, confined to the temperate regions of the northern hemisphere, very near the *Willows* in flowers and fruit, but distinct in habit and foliage, and in the presence of an apparent perianth.

Under side of the leaves and young shoots very white and cottony

1. *White P.*

Under side of the leaves green and glabrous.

Leaves ovate-triangular, tapering at the top, with small, regular teeth

3. *Black P.*

Leaves small, orbicular or rhomboidal, irregularly and rather coarsely toothed

2. *Aspen P.*

The *Tacamahac* or *balsam P.* (*P. balsamifera*), the *Carolina P.* (*P. angulata*), and some other North American species, are to be met with in our plantations.

1. *White Poplar. Populus alba*, Linn. (Fig. 925.)

(Eng. Bot. t. 1618. *Abele.*)

A tall and handsome tree, with a light-grey or ash-coloured bark,

the young shoots, as well as the under side of the full-grown leaves, covered with a close, very white cotton. Leaves orbicular or very broadly ovate, irregularly sinuate or shortly lobed, more or less cordate at the base. Catkins sessile, about 2 inches long, the membranous scales jagged at the top, very deciduous, hairy in the males, less so in the females. Stamens usually about 8. Lobes of the stigmas linear.

Along streams, and in open, moist woods, dispersed over central and southern Europe and temperate Russian Asia, scarcely extending into northern Germany. In Britain, very generally planted, and probably truly indigenous in eastern and southern England. *Fl.*

spring. The *grey P.* (*P. canescens*, Eng. Bot. t. 1619) is a variety with rather smaller leaves, seldom lobed, and not so white.



Fig. 925.

2. Aspen Poplar. *Populus tremula*, Linn. (Fig. 926.)

(Eng. Bot. t. 1909. *Aspen*.)

A smaller tree than our two other *Poplars*, of slower growth, the branches more slender. Leaves nearly orbicular, like those of the *white P.*, but smaller, often not an inch broad, less deeply toothed, scarcely cordate, of a thinner texture, without any white cotton, although sometimes very pale underneath; the leafstalks particularly slender, so that the blade trembles with the slightest motion of the air. Catkins much smaller than in the *white P.*, the scales as well as the stigmas more deeply divided. Stamens usually 6 to 8.

In woods and forests, throughout Europe and Russian Asia, from the Mediterranean to the Arctic Circle. In Britain, apparently more frequent in Scotland than in England or Ireland. *Fl.* *early spring.*



Fig. 926.

3. Black Poplar. *Populus nigra*, Linn. (Fig. 927.)

(Eng. Bot. t. 1910.)



Fig. 927.

A tall, quick-growing tree, readily assuming a somewhat pyramidal form, quite glabrous, with very glutinous buds. Leaves broadly rhomboidal or nearly triangular, tapering at the top, the lower angles rounded, the edge crenated or serrated, green on both sides. Catkins loose, about 2 inches long, the scales hairy only at the tips. Stamens more numerous than in the *Aspen* or the *white P.*, and the lobes of the stigmas shorter and broader.

In moist places, the borders of streams, etc., in central and southern Europe, and the more temperate portions of Russian Asia. In northern Europe it has been much planted, and is now common in Scandinavia as well as in Britain, but probably not truly indigenous even in southern England. *Fl. early spring.*

The well-known *Lombardy P.* is believed to be a cultivated variety of the *black P.* of Eastern origin.

LXXIII. THE PINE FAMILY. CONIFERÆ.

Trees or shrubs, mostly with resinous juice. Leaves stiff, and in the European genera always entire, either subulate or linear, or short or scale-like. Flowers monœcious or diœcious, in cylindrical or short catkins, with closely-packed scales, or the females rarely solitary. Stamens inserted either on the axis of the catkin under the scales, or the anther-cells sessile on the inside of the scales themselves, which then form a part of the stamens. Ovules and seeds *naked*, that is, without ovary, style, or pericarp, either inserted under the catkin-scales or solitary and quite exposed.

An extensive Order, spread over the whole globe, although within the tropics chiefly confined to mountainous districts. In the northern hemisphere they often form vast forests, and include the loftiest trees

known. Three species only are indigenous to Britain, but a large number of exotic ones are generally planted, and some to such an extent as now to cover large tracts of country. The very peculiar structure of the flowers and seeds of this and the adjoining small tropical family of *Cycadeæ*, has induced many botanists to consider them as a separate class, distinct both from *Dicotyledons* and *Monocotyledons*.

- Male catkins cylindrical, with 2 anther-cells to each scale. Fruit
a dry cone, with 2 winged seeds under each scale 1. PINE.
Male catkins small, with 4 anther-cells to each scale. Fruit
small and succulent, containing 2 or 3 hard seeds 2. JUNIPER.
Male catkins small, with 3 to 8 anther-cells to each of the upper
scales. Fruit a single seed, half immersed in a succulent
cup 3. YEW.

The most commonly planted *Conifers*, not belonging to the above genera, are species of *Cypress*, resembling *Junipers* in foliage and male flowers, but the fruit is larger and woody, with numerous small seeds; or of *Thuia*, very near *Cypress*, but with flattened branches, and very small, ovate, dry cones with few seeds; or of *Taxodium*, with deciduous leaves, and a small cone near that of *Cypress*; besides the *Sequoias* of California, *Cryptomeria* from Japan, and several others of recent introduction likely to become common in our plantations.

I. PINE. PINUS.

Trees, with linear or subulate leaves. Male catkins closely imbricated, with 2 adnate anther-cells on the inside of each scale (at least apparently so, for in fact the scale is the connectivum of the anther, and the whole catkin thus consists of nothing but closely imbricated anthers). Female catkins short, consisting of closely imbricated scales, with 2 ovules on the inside of each; the *foramen*, or open pore at the top of the ovule, turned downwards. Fruit a *cone*, consisting of more or less hardened, imbricated scales, each one covering 2 winged seeds.

A large genus, constituting the great mass of the *Conifers* of the northern hemisphere, scarcely penetrating into the tropics, and unknown in the southern hemisphere.

1. Scotch Pine. *Pinus sylvestris*, Linn. (Fig. 928.)

(Eng. Bot. t. 2460. *Common Pine*, *Norway* or *Riga Pine* or *Fir*,
Scotch Fir.)

A tree of considerable size; the main trunk simple or forked, with a reddish bark, and a rather dense head, but less so than in many other species. Leaves stiffly subulate, evergreen, seldom above 2 inches long, in pairs, surrounded by short, scarios scales. Cones

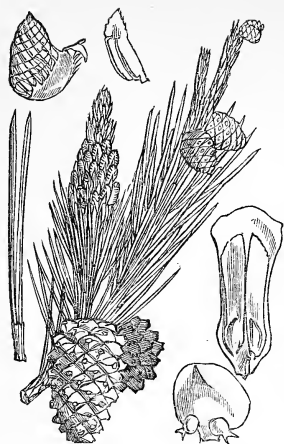


Fig. 928.

sessile, ovoid, conical, recurved when young; the scales hard and woody, much thickened upwards, with a short, thick point, often turned backward in the lower scales of one side of the cone, but generally disappearing as the cone ripens. Seeds with an obliquely lanceolate, obtuse wing, 2 or 3 times as long as the seed itself.

Widely distributed over northern and central Europe and Russian Asia, chiefly in granitic or sandy soils, and in the mountains of southern Europe and the Caucasus. Truly indigenous in the Scotch Highlands, and in former times in Ireland; extensively planted all over Britain, and quite naturalized in some parts of southern England. *Fl. spring.*

The cultivated species of this genus are very numerous, belonging to the four principal sections, considered by some as genera, viz.:—1. The *true Pines*, with subulate evergreen leaves, in clusters of 2 to 5, and hard cones with the scales usually thickened at the top, including, besides the *Scotch P.*, the *Pinaster* or *maritime P.*, the *Weymouth P.*, the *Roman P.*, etc. 2. The *Spruce Firs*, with shorter, somewhat flattened leaves, arranged singly and often in two opposite ranks, and with thin scales to the cones, including the *common* or *Norway Spruce*, now almost naturalized in Britain, the *silver Spruce*, the *Hemlock Spruce*, the *balm of Gilead Fir*, the *Douglas Pine*, etc. 3. The *Larch*, with short, fine, deciduous leaves, in dense clusters, and small cones with thin scales; and 4. The *Cedar of Lebanon*, and *Deodara*, with short, evergreen, subulate leaves, clustered as in the *Larches*, and large, hard, closely packed cones.

II. JUNIPER. JUNIPERUS.

Shrubs or small trees, with evergreen leaves, either small and scale-like, or spreading, stiff, and pointed, or both kinds on the same shrub. Flowers usually dioecious, in minute axillary catkins; the males consisting of broad, shield-shaped scales, with 3 to 6 anther-cells attached to their lower edge; the females with imbricated, empty scales at the base, and 3 to 6 fleshy ones at the top, coalescing into one, and enclosing as many ovules, with their foramen or open pore turned upwards. Fruit a small berry, formed by the succulent scales, enclosing 1 or 2 hard seeds.

A numerous genus, nearly as widely spread as the *Pines* over the northern hemisphere.

1. Common Juniper. *Juniperus communis*, Linn. (Fig. 929.)

(Eng. Bot. t. 1100.)

A much branched, evergreen shrub, sometimes procumbent, sometimes ascending or erect, 2, 3, or even 4 feet high. Leaves in whorls of 3, linear, spreading, ending in a prickly point, not above 6 lines long, of a bright green underneath, glaucous and concave above. Catkins scarcely above a line long. Berries globular, of a dark purple-blue, the size of a large pea.

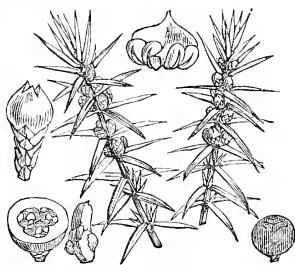


Fig. 929.

On rather dry, barren hills, in Europe and Russian Asia, from the Mediterranean to the Arctic regions, and in northern America. Dispersed over the British Isles, but more common in the north than in the south. *Fl. spring*. A dwarf mountain variety, not uncommon in Scotland, with a closely procumbent stem, and rather shorter, less prickly leaves, has been distinguished as a species, under the name of *J. nana* (Eng. Bot. Suppl. t. 2743).

The cultivated species include the American *red* or *pencil Cedar* (*J. virginiana*), the south European *Savin* (*J. sabina*), and several other North American and Asiatic species.

III. **YEW.** TAXUS.

Trees or shrubs, with evergreen linear leaves. Flowers mostly diœcious. Catkins small, with empty, imbricated scales at the base; the males terminating in a cluster of stamens, each consisting of 3 to 8 anther-cells, under a shield-like scale or connectivum; the females of a single erect ovule, with a small cup-shaped disk round its base. Fruit a hard seed, partly imbedded in a pulpy, berry-like cup.

A small genus, extending all round the northern hemisphere.

1. Common Yew. *Taxus baccata*, Linn. (Fig. 930.)

(Eng. Bot. t. 746.)

A densely branched, dark, evergreen trees, not lofty, but attaining a



Fig. 930.

great age, with a thick trunk and hard wood. Leaves 6 to 9 lines long, inserted all round the branches, but spreading in one plane in two opposite ranks, convex and shining on the upper side. Catkins very small, in the axils of the leaves. Fruits, though small, conspicuous by their bright red, half-transparent, juicy cups.

Dispersed over central Europe, and the mountains of southern Europe, extending eastward into the mountains of central Asia, and northward to southern Scandinavia. Common in Britain, having been much planted in earlier times; it appears, however, to be truly indigenous in hilly districts in England, south-

ern Scotland, and northern Ireland. *Fl. spring*. The *Irish* or *Florence-Court Yew*, a shrub with erect branches, is a garden variety of the common *Y*.

CLASS II. MONOCOTYLEDONS.

Stem not distinguishable into pith, wood, and bark, but consisting of bundles of fibres, irregularly imbedded in cellular tissue, with a firmly adherent rind outside. Seeds with one cotyledon, the embryo undivided, the young stem being developed from a sheath-like cavity on one side.

Besides the above positive characters, *Monocotyledons* may be generally known by their simple, entire, alternate or radical leaves, with simple parallel veins, the base usually encircling or sheathing the stem or the base of the next leaf; and the parts of the flowers are most frequently in threes, the calyx and corolla, when present, being generally similar in appearance, forming a single perianth of six parts. In several families, however, the perianth is entirely wanting, or reduced to a very few small scales; in the *Arum* family, in *Tamus*, and *Paris*, the leaves are somewhat netted-veined; and in some *Naiads*, and in *Paris*, and some *Convallarias*, they are opposite or whorled.

LXXIV. THE BULRUSH FAMILY. TYPHACEÆ.

Reed-like marsh or aquatic herbs, with long, linear leaves. Flowers monœcious, in dense spikes or globular clusters, without any perianth. Ovary tapering into a slender, simple style. Fruit a small, seed-like nut, with a single pendulous seed. Embryo straight, in a copious albumen.

A family limited to the two British genera.

Flowers in long, dense, cylindrical spikes 1. BULRUSH.

Flowers in distinct globular heads 2. SPARGANIUM.

I. **BULRUSH.** TYPHA.

Flowers in a long, very dense, cylindrical and simple spike, terminating the stem, the upper part consisting of stamens only, intermixed with hairs, the lower part more dense, with minute ovaries, surrounded by numerous hairs. Nuts very small, enveloped in a copious down.

A small genus, spread over the greater part of the globe.

Male flowers close above the females, in an uninterrupted spike 1. *Great B.*

Male and female parts of the spike separated by a short interval without flowers 2. *Lesser B.*

1. **Great Bulrush.** *Typha latifolia*, Linn. (Fig. 931.)

(Eng. Bot. t. 1455. *Bulrush. Cat's-tail. Reedmace.*)

Rootstock shortly creeping, with erect, reed-like stems, 3 to 6 feet high. Leaves very long, erect and linear, sheathing at the base, but flat in the greater part of their length. Flowers in a continuous spike, often more than a foot long, the upper male portion rather thicker when in flower, yellow with the very numerous closely packed, linear anthers; the minute ovaries of the lower part as closely packed, and enveloped in tufts of soft, brownish hairs. When in fruit, the upper part of the spike is a bare stalk, whilst the lower part has thickened by the enlargement of the nuts, still enveloped in the rusty down.

On the margins of ponds, lakes, and watery ditches, nearly all over the globe, except the extreme north and south.

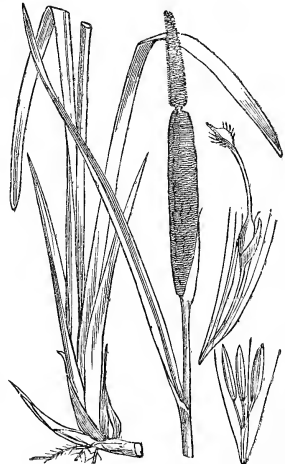


Fig. 931.

Abundant in England, Ireland, and southern Scotland, but not in the Highland districts. *Fl. summer.*

2. Lesser Bulrush. *Typha angustifolia*, Linn. (Fig. 932.)

(Eng. Bot. t. 1456.)



Fig. 932.

Differs from the *great B.* chiefly in the interruption in the spike between the male and the female flowers, for a space varying from a few lines to an inch in length. It is also usually smaller, with narrower and stiffer leaves, more concave on the upper side, and the spikes are more slender, but all these characters are very variable.

Accompanies the *great B.* over the greater part of its area, but is not quite so common, and scarcely extends so far north. In Britain, probably confined to England and Ireland. *Fl. summer.*

II. SPARGANIUM. SPARGANIUM.

Flowers in globular heads, placed at a distance from each other along the summit of the stem, with leaf-like bracts under the lower ones. Upper heads all males, consisting of stamens with minute scales irregularly interposed; the lower heads larger, all females, consisting of sessile ovaries, each one surrounded by 3 to 6 scales, forming an irregular perianth.

A small genus, dispersed over the northern hemisphere without the tropics.

Inflorescence branched, each branch bearing more than one head. 1. *Branched S.*

Inflorescence simple.

Stem and leaves erect 2. *Simple S.*

Stem weak. Leaves floating.

Fruiting heads rather large, with long linear styles or points to the nuts 2. *Simple S., var.*

Fruiting heads small, with very short styles or points to the nuts 3. *Small S.*

1. **Branched Sparganium.** *Sparganium ramosum*, Huds.
(Fig. 933.)

(Eng. Bot. t. 744. *Bur-reed.*)

Stems erect, simple or branched, 2 feet high or more, sheathed below by the long, linear leaves, which usually far surpass the inflorescences. These form a kind of panicle at the summit of the stem, with 3 or 4 to 6 or 8 simple branches, each bearing 6 to 12 or even more male heads, about the size of a pea till the stamens expand, when they are about 4 lines in diameter; the lower female heads are fully 6 lines in diameter, glabrous, with the long, linear points of the stigmas very prominent.

On the margins of ponds, lakes, and streams, almost all over Europe and Russian Asia, and a portion of North America, but scarcely reaching the Arctic Circle. Extends all over Britain. *Fl. summer.*



Fig. 933.

2. **Simple Sparganium.** *Sparganium simplex*, Huds.
(Fig. 934.)

(Eng. Bot. t. 745.)

Rather smaller than the *branched S.*, with narrow leaves; the flower-heads much fewer, at considerable distances from each other along the simple summit of the stem; all sessile except the lowest female, which is often on a peduncle of 1 to 2 inches. Flowers as in the *branched S.*

In similar situations, and nearly as widely distributed as the *branched S.*, but not quite so common. Not unfrequent in England and Ireland, but more rare in Scotland. *Fl. summer.* A *floating* variety found occasionally, but rarely, in deeper water, has the weak stems and long floating leaves nearly of the *small S.*, with which it was confounded in the first edition of this Hand-



Fig. 934.

book. It is however a larger plant, and has the long styles or points of the fruit of the *simple S.* It is distinguished as a fourth species in the 'British Flora' and in Babington's Manual.

3. Small Sparganium. *Sparganium minimum*, Fries.

(Fig. 935.)



Fig. 935.

An aquatic plant; the weak stems ascending to the surface of the water, on which the long, narrow leaves float. Flower-heads very few, with long, linear bracts; the 2 or 3 lowest ones female, and often shortly stalked. Fruiting heads smaller than in the last two species, and the styles or points to the fruits very much shorter.

In lakes and pools, in northern and Arctic Europe, Asia, and America; and in the high mountain-ranges of southern Europe and central Asia. In Britain, more frequent in Scotland and Ireland than in England. *Fl. summer.*

LXXV. THE ARUM FAMILY. AROIDEÆ.

Herbs, with the rootstock often tuberous but not bulbous; the veins of the leaves sometimes branched or even netted, almost as in *Dicotyledons*. Flowers closely packed in a dense spike, called a *spadix*, with a leaf-like or coloured bract at the base, called a *spatha*. The stamens and ovaries either in different parts of the spike or mixed together, without any perianth, or separated by small scales, which rarely form a small regular perianth. Ovary with 1 or several cells, each with 1 or more ovules. Fruit a berry. Seeds with or rarely without albumen.

A considerable family, chiefly from the tropical and warmer parts of the globe, where many acquire a considerable size, or climb up the stems of trees. The large spatha and broad leaves are at once cha-

racteristic of the majority of species ; a few however come near to the *Bulrushes* in habit, but are always distinguished by their succulent fruit, and in most cases by the seeds, or at least the ovules, not solitary.

Leaves broad. Spatha large 1. **ARUM.**
Leaves and spatha long and linear Plant reed-like 2. **ACORUS.**

I. **ARUM.** ARUM.

Spatha large, *convolute* (the edges rolled over each other) at the base. No perianth. Pistils or female flowers at the base of the spike. Stamens or male flowers above them; the club-shaped summit of the axis without flowers. Berry with 1 or very few seeds.

A genus sometimes limited to a very few species, from Europe and temperate Asia, sometimes extended so as to comprehend a large portion of the *Aroideæ* of the northern hemisphere without the tropics.

1. **Common Arum.** *Arum maculatum*, Linn. (Fig. 936.)

(Eng. Bot. t. 1298. *Cuckoo-pint. Wake-robin. Lords-and-Ladies.*)

Rootstock an acrid white tuber. Leaves on long, radical footstalks, ovate-hastate; the lobes of the base straight or shortly diverging, of a dark, shining green, sometimes spotted with purple or marked with pale whitish veins. Spatha 6 to 8 inches long, obliquely campanulate, tapering to a point at the top, the convolute part contracted above the base. Spike half concealed in the spatha, the club-shaped yellow or purplish top alone appearing above the convolute part. Berries bright red, in a short spike, on a naked peduncle, the leaves and spatha having died away before they are ripe.

In woods and thickets, under hedges, etc., chiefly in central Europe, from northern Italy and Spain to southern Scandinavia. Frequent in England and Ireland, rare in southern Scotland. *Fl. spring.* The white-veined variety from the Isle of Wight has been mistaken for the south European *A. italicum*.

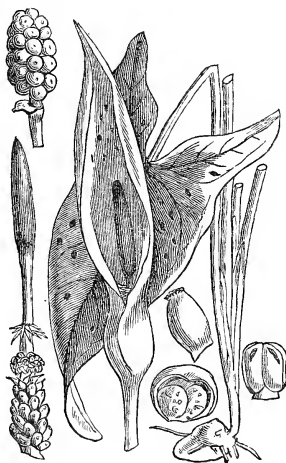


Fig. 936.

II. **ACORUS.** ACORUS.

A single species, distinguished as a genus by the leaf-like spatha not enclosing the spike, and by the numerous hermaphrodite flowers consisting of a perianth of 6 short scales, 6 stamens, and a 2- or 3-celled ovary, all closely packed in a dense, cylindrical spike.

1. Sweet Acorus. *Acorus calamus*, Linn. (Fig. 937.)

(Eng. Bot. t. 356. *Sweet Flag*. *Sweet Sedge*.)

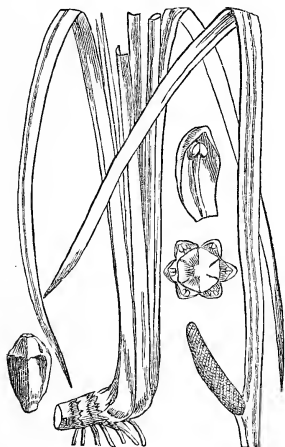


Fig. 937.

A highly aromatic, reed-like plant, with a thick, shortly creeping rootstock. Leaves linear and erect, 2 or 3 feet long, about half an inch broad. Flowering-stem simple and erect, the long, linear, leaf-like spatha forming a flattened continuation, with the spike sessile at its base so as to appear lateral; it is cylindrical, very dense, 2 to 3 inches long, of a yellowish-green colour.

On the edges of lakes and streams, all over Europe, except the extreme north; rare in the most western States, but extends all across Russian and central Asia into North America. In Britain, believed to be indigenous only in some of the eastern counties of England, but has been introduced into many parts of England and southern Scotland. *Fl. summer*.

LXXVI. THE DUCKWEED FAMILY. LEMNACEÆ.

A single genus, united by some with the *Arum* family, but anomalous in its mode of vegetation and very reduced flowers.

I. **DUCKWEED.** LEMNA.

Floating plants, without distinct stems or real leaves, but consisting of small, leaf-like *fronds*, either separate or cohering two or three together by their edges, emitting one or more fibres from their under

surface into the water, and multiplying by similar fronds growing out of their edges. Flowers very rare, appearing from a fissure in the edge of the frond, and consisting of a minute membranous bract or *spatha*, enclosing 2 stamens (or 1 only in an exotic species) and a single 1-celled ovary, with one or more ovules, a short style, and no perianth.

A small genus, widely distributed over Europe, northern Asia, and North America, but rare in the tropics.

Roots in clusters. Fronds above 3 lines diameter . . . 4. *Greater D.*

Roots solitary.

Fronds very thin, oblong or narrowed at one end (the young ones usually projecting on each side at right angles) . . . 1. *Ivy-leaved D.*

Fronds broadly ovate, under 3 lines diameter.

Fronds rather thick, slightly convex underneath . . . 2. *Lesser D.*

Fronds very thick and convex underneath . . . 3. *Gibbous D.*

1. Ivy-leaved Duckweed. *Lemna trisulca*, Linn. (Fig. 938.)

(Eng. Bot. t. 926.)

Fronds very differently shaped from those of the other species, and much thinner. They are usually near 6 lines long and about half that breadth, thin, narrow and minutely toothed at one end, and ending in a little stalk at the other, with 2 young ones usually growing from opposite sides near the base, and a single root from underneath. Flowers of the *lesser D.*

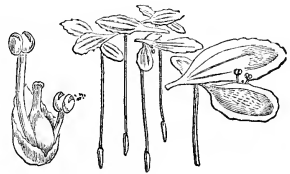


Fig. 938.

On ponds and still waters. One of the common species on the Continent, but less so in Britain, especially in the north. *Fl. summer, but very rarely.*

2. Lesser Duckweed. *Lemna minor*, Linn. (Fig. 939.)

(Eng. Bot. t. 1095.)

Fronds usually about 2 lines long, broadly ovate or orbicular, cohering 3 or 4 together, with 1 root under each but without any stalk, quite entire, and of a rather thick consistence. Ovary with a single ovule.

On ponds and still waters, throughout the range of the genus, and generally

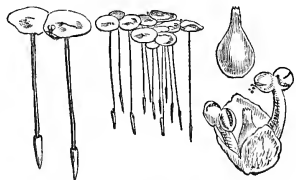


Fig. 939.

the commonest species, often covering the water to a great extent. *Fl. summer*, and more easily met with in that state than any other species.

3. Gibbous Duckweed. *Lemna gibba*, Linn. (Fig. 940.)

(Eng. Bot. t. 1233.)

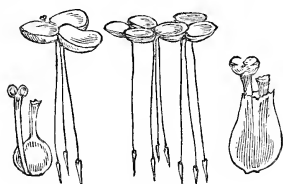


Fig. 940.

Fronds shaped like those of the *lesser D.*, but rather larger and much thicker, flat above, spongy and almost hemispherical underneath, with a single root to each. Stamens 2. Ovary with 2 or more ovules.

With the station and range of the *lesser D.* it is everywhere less common. Rare in England and Ireland, and still more so in Scotland. *Fl. summer*, very rarely.

4. Greater Duckweed. *Lemna polyrrhiza*, Linn. (Fig. 941.)

(Eng. Bot. t. 2458.)

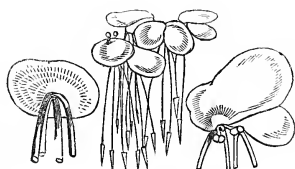


Fig. 941.

Fronds larger than in any other species, attaining 3 or 4 lines diameter, broadly ovate or orbicular, rather thick, with a cluster of roots under each one. Flowers of the *gibbous D.*

As widely dispersed as the other species, and rather more frequent than the *gibbous D.*, but much less so than the two others. The flowers appear to have been but once observed.

LXXVII. THE NAIAD FAMILY. NAIADEÆ.

Aquatic floating or submerged plants; the leaves either sheathing at the base or accompanied by sheathing stipules, alternate or sometimes opposite. Flowers axillary, inconspicuous, solitary or spiked, usually proceeding from a sheathing bract. Perianth none, or consisting of 4 small, scale-like segments. Stamens 1, 2, or 4.

Ovaries either of 2 or 4 distinct carpels, each with a single ovule and a separate stigma, or single, with 1 ovule and 2 to 4 stigmas. Fruit consisting of 1, 2, or 4 seed-like nuts, each with one seed, without albumen.

An Order not numerous in species, but abundantly diffused over all parts of the world, in the sea as well as in fresh waters.

- Stems creeping in sand or mud under salt water. Leaves very long and linear. Flowers within the base of a long, linear bract, like the stem-leaves 1. *ZOSTERA*.
- Stems floating. Flowers axillary.
- Ovaries simple, with 1 style and 2 or 3 stigmas. Leaves opposite or whorled, and often toothed 2. *NAIAD*.
- Ovaries of 4 carpels, each with a separate stigma.
- Flowers and carpels axillary and sessile. Leaves opposite, very slender 3. *ZANNICHELLIA*.
- Flowers usually 2, on an axillary peduncle. Carpels stalked, pear-shaped. Leaves alternate, very slender 4. *RUPPIA*.
- Flowers in pedunculate spikes or heads. Carpels sessile. Leaves alternate or rarely opposite 5. *PONDWEED*.

I. *ZOSTERA*. *ZOSTERA*.

Marine herbs, the stem creeping and rooting in the sand or mud, with long, grass-like, alternate leaves. Flowers enclosed in a sheath near the base of leaves similar to the others, but usually smaller. Within this sheath is an oblong or linear, thin, leaf-like peduncle, on one side of which are arranged in two rows a few sessile anthers, with 3 or 4 sessile or nearly sessile ovaries, tapering into a deeply 2-cleft, linear style. Embryo split longitudinally into 2 valves, which fold over a long, curved, linear radicle.

A genus hitherto limited to the two British species.

- Leaves seldom a foot long. Ripe seeds smooth 2. *Dwarf Z.*
 Leaves usually more than a foot long. Ripe seeds furrowed 1. *Common Z.*

1. *Common Zostera*. *Zostera marina*, Linn. (Fig. 942.)

(Eng. Bot. t. 467. *Grass-wrack*.)

Creeping stems or rootstocks often very long and rather fleshy. Leaves varying from near a foot to several feet in length, and from 2 to 3 or 4 lines in breadth, with 3, 5, or even 7 more or less distinct parallel nerves. Flowering sheath near the base of the floral leaves,



Fig. 942.

from 1 to $1\frac{1}{2}$ or near 2 inches long. The flattened peduncle narrow-linear, and said to be always without the horizontal appendages of the *dwarf Z.* Seeds oblong, marked by longitudinal furrows.

Common near the sandy or muddy edges of the sea, in most parts of the world, usually at or below low-water mark, and often thrown up in great quantities by the tide. Abundant round the British Isles. *Fl.* summer, or, according to some, in spring only.

2. Dwarf Zostera. *Zostera nana*, Roth. (Fig. 943.)

(Eng. Bot. Suppl. t. 2931.)

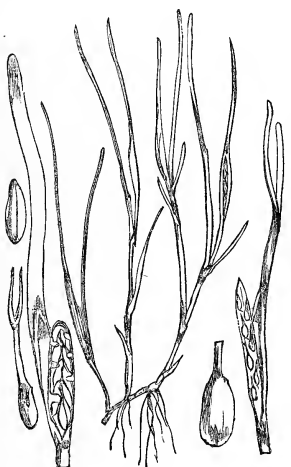


Fig. 943.

Closely resembles the smaller forms of the *common Z.*, of which it is believed by some to be a mere variety. The leaves are usually from a few inches to near a foot long, very narrow, with only 1 or rarely 3 distinct nerves; the flowering sheath about half an inch long, and the flattened peduncle inside has to every ovary a little transverse appendage or band. Seeds shorter than in the *common Z.*, perfectly smooth.

On sandy shores, usually between high- and low-water marks, in various parts of the world. Common in western Europe, and has been found on several points of the British coasts. *Fl.* summer and autumn. The seeds appear certainly distinct in the two species; the constancy of the other characters is

doubtful. I have examined only the dwarf species in a living state.

II. **NAIAD.** NAIAS.

Slender, branching, submerged plants, with linear, opposite or ternate leaves, often crowded into whorls or clusters, and usually toothed. Flowers small and sessile, often clustered with the branch-leaves in the axils, and dicœious or rarely monœious; the males consisting of a single, nearly sessile anther, enclosed in a little membranous bract; the females of a single ovary, sessile in the sheathing base of the leaf, with 2 to 4 subulate stigmas. Fruit a small, seed-like nut. Embryo straight.

A genus of few species, widely spread over a great part of the globe.

1. **Slender Naiad.** *Naias flexilis*, Rostk. (Fig. 944)

Leaves narrow-linear, usually in whorls of 3, or sometimes opposite, often clustered in the axils, about 6 or 8 lines long; the teeth few and very minute. Stigmas usually 3, sometimes 4. Fruit oblong, about a line long.

A common North American species, observed in a few scattered localities in Europe, and recently detected by Mr. D. Oliver in Connemara, in Ireland. *Fl. summer.*



Fig. 944.

III. **ZANNICHELLIA.** ZANNICHELLIA.

A genus limited to a single species; differing from the narrow-leaved *Pondweeds* by the monœious flowers sessile in the axils and without perianth, from *Ruppia* in the usually opposite leaves, in the single stamen with a long filament, and in the shape of the fruit.

1. **Common Zannichellia.** *Zannichellia palustris*, Linn. (Fig. 945.)

(Eng. Bot. t. 1844. *Horned Pondweed*.)

Stems slender, branched, and floating. Leaves finely linear, bright



Fig. 945.

in Britain. *Fl. the whole summer.*

green, 1 to 2 inches long, mostly opposite, with a small, sheathing membranous stipule embracing the stem within-side. At the time of flowering there are usually about 4 ovaries together, almost sessile within the stipule, each with a short style and a broad, disk-shaped stigma, and a solitary stamen with a slender filament in the same or in a separate axil; the anthers 2- or 4-celled. When ripe the carpels are 1 to $1\frac{1}{2}$ lines long, sessile or shortly stalked, somewhat curved and flattened, tipped by the remains of the style; the ribs on the back often crenated, warted, or slightly winged.

In ponds, or lagoons of fresh or brackish or even salt water; dispersed over a great part of the globe. Common

IV. **RUPPIA.** *RUPPIA.*

A single species, distinguished as a genus from *Zannichellia* by the alternate leaves, 2 sessile anthers, and the carpels in fruit all stalked and pear-shaped.

1. *Sea Ruppia.* *Ruppia maritima*, Linn. (Fig. 946.)

(Eng. Bot. t. 136. *R. rostellata*, Bab. Man.)

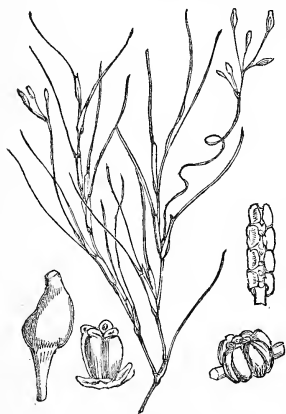


Fig. 946.

A slender, branched, floating plant, much resembling in appearance the *Fennel Pondweed*. Leaves almost capillary, with a dilated, sheathing base. Peduncles axillary, at first very short, bearing 1 or 2 flowers, each consisting of 2 almost sessile anthers, with 2 distinct cells, and 4 carpels, at first nearly sessile. As the fruit ripens, the carpels become little ovoid or pear-shaped obliquely-pointed nuts, 1 to $1\frac{1}{2}$ lines long, raised on pedicels, varying from 2 or 3 lines to an inch in length, the common peduncle also lengthening considerably.

In salt-marshes, lagoons, and shallow creeks and bays, dispersed over nearly

the whole globe, excepting perhaps South America. Common round the British Isles. *Fl. summer and autumn.*

V. **PONDWEED.** POTAMOGETON.

Aquatic herbs, with a perennial rootstock, long, floating, usually forked stems, and alternate or rarely opposite leaves, either dilated and sheathing at the base, or having all or some of them a sheathing, scarious stipule in their axil. Flowers small, sessile in a spike or head, on an axillary peduncle rising above the water. Perianth of 4 scale-like segments. Stamens 4, opposite the segments; the anthers sessile and 2-celled. Carpels 4, each with a very short style or a sessile stigma. Nuts small and seed-like, sessile, usually laterally compressed.

A considerable genus, most of the species spread over the greater part of the globe, chiefly in fresh-water, but some accommodating themselves also to salt-water, and many of them very variable in foliage. In the species with axillary stipules, these are sometimes only to be seen under the peduncles or under the branches of the stem.

Upper leaves on long stalks, floating on the surface of the water.

Lower submerged leaves stalked or reduced to mere leafstalks 1. *Broad P.*

Lower submerged leaves sessile or nearly so.

Lower submerged leaves linear, 1-nerved or slightly 3-nerved. 2. *Various-leaved P.*

Lower submerged leaves lanceolate, with 5, 7, or more nerves 3. *Shining P.*

All the leaves under water and sessile.

Leaves all opposite 7. *Opposite P.*

Leaves alternate, except under the peduncles or forks.

Leaves broadly ovate, clasping the stem all round 5. *Perfoliate P*

Leaves ovate-lanceolate or oblong, broad at the base and clasping the stem 4. *Long P.*

Leaves lanceolate or linear, tapering at the base, or not stem-clasping.

Leaves broadly linear or lanceolate, flat and entire, with many nerves 3. *Shining P.*

Leaves broadly linear, obtuse, waved, 1- or 3 nerved 6. *Curly P.*

Leaves narrow-linear, not waved, 1- or 3-nerved.

Leaves dilated at the base into a sheath scarious at the edges 9. *Fennel P.*

Leaves not dilated at the base, with a scarious stipule in the axil 8. *Slender P.*

1. Broad Pondweed. *Potamogeton natans*, Linn.

(Fig. 947.)

(Eng. Bot. t. 1822, *P. oblongus*, Suppl. t. 2849. *P. polygonifolius*, Bab. Man.)

Fig. 947.

One of the largest of our *Pondweeds*. Leaves stalked, the upper ones floating on the surface of the water, of a thick, opaque texture, ovate or oblong, 2 to 4 inches long by 1 to 1½ broad, usually rounded at the base, sometimes cordate or tapering, marked by several longitudinal nerves, with a few cross-veins often branched or slightly netted; the submerged leaves thinner and narrower, but all stalked or reduced to a mere stalk. Axillary stipules closely sheathing, often an inch long. Spike dense and cylindrical, often an inch long or more, on a stout peduncle of several inches. Nuts ovoid, above a line long, slightly compressed, nearly straight, the inner edge rounded outwards, with 1 or sometimes 3 dorsal ribs.

In stagnant or running waters, deep or shallow, sunny or shaded, in almost all parts of the world, and varies accordingly in the size, shape, and texture of the foliage, the size and number of the flowers, fruits, etc. Abundant in Britain. *Fl. summer*. A variety with the leaves all under water, thin and almost transparent, although stalked and broad, and with smaller spikes and fruits, is often admitted as a species, under the name of *P. plantaginicus* (Eng. Bot. Suppl. t. 2848).

2. Various-leaved Pondweed. *Potamogeton heterophyllus*, Schreb. (Fig. 948.)

(Eng. Bot. t. 1285.)

Usually much smaller than the *broad P.*, which it resembles in the long stalk and the ovate or oblong shape of its floating leaves, but these are only 1 to 2 inches long, and the submerged leaves are all narrow-lanceolate or linear, with the few veins of the *slender P.*, tapering at both ends but not distinctly stalked. Spikes and fruits like those of the smaller forms of the *broad P.*

Chiefly a North American species, not common in Europe, where it appears to be rather a western plant. Occurs in many parts of Britain. *Fl. summer*. Sometimes the floating leaves are not developed, and then it is scarcely to be distinguished from the *slender P.* except by its larger size, with a denser spike, and generally a firmer consistence.

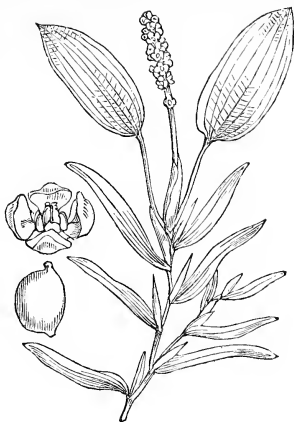


Fig. 948.

3. Shining Pondweed. *Potamogeton lucens*, Linn. (Fig. 949.)

(Eng. Bot. t. 376. *P. longifolius*, Eng. Bot. Suppl. t. 2847.)

A large species, the leaves usually all thin and under water, sessile or nearly so, tapering at both ends or scarcely obtuse, 2 or 3 to near 6 inches long, seldom above half an inch broad, marked with 2 or 3 well-defined longitudinal nerves on each side of the midrib, besides several intermediate fainter ones, and a few transverse reticulations. Flowers as in the *broad P.*

In ponds and rivers, usually rather deep, generally distributed over the globe, except the extreme north. Not uncommon in Britain. *Fl. summer*. A variety with the upper leaves floating on the surface and shortly stalked, either lanceolate or oblong, has been distinguished under the name of *P. rufescens* (*P. fluitans*, Eng. Bot. t. 1286). The *lanceolate P.* (*P. lanceolatus*, Eng. Bot. t. 1985) appears to be a smaller state of the same species, which is always to be distinguished from the

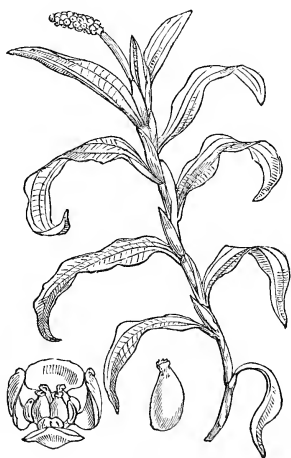


Fig. 949.

broad P. and the *various-leaved P.* by the sessile, many-nerved lower leaves.

4. Long Pondweed. *Potamogeton prælongus*, Wulf.
(Fig. 950.)

(Eng. Bot. Suppl. t. 2858.)



Fig. 950.

A large species, with the leaves all submerged and thin, with numerous longitudinal veins, and a few transverse reticulations, like the *shining P.*, but the leaves are broader, all closely sessile, and half-clasping the stem by their rounded base, usually 3 or 4 inches long, obtuse at the tip, and concave, so as to split in drying. Stipules very prominent. Peduncles long and stout, with the flowers and fruits usually larger than in the *broad P.*, in a rather close spike.

In pools and rivers, generally distributed over the globe, except the extreme north. In Britain, not so common as the *shining P.* *Fl. summer.*

5. Perfoliate Pondweed. *Potamogeton perfoliatus*, Linn.
(Fig. 951.)

(Eng. Bot. t. 168.)



Fig. 951.

Leaves all submerged, thin and many-nerved as in the *long P.* and the *shining P.*, but much shorter, usually ovate, obtuse, completely clasping the stem; the auricles often united on the opposite side, so that the leaf appears to be pierced through; from 1 to $1\frac{1}{2}$ inches long by full an inch broad. Stipules as in the preceding species, but soon disappearing. Spike of flowers seldom above 6 or 8 lines long.

In rivers and ponds, all over the northern hemisphere, and in Australia. Generally distributed in Britain. *Fl. summer.*

6. Curly Pondweed. *Potamogeton crispus*, Linn.
(Fig. 952.)

(Eng. Bot. t. 1012, *the leaves too much lobed*.)

One of the most marked of the alternate-leaved species. Leaves all submerged and thin, narrow-oblong or broadly linear, obtuse, shortly tapering at the base, 1 to 2 inches long, 3 to 5 lines broad, always waved and sinuated on their edges, and marked by 1 strong midrib and 2 parallel slender nerves at some distance from it, but connected with it by a few transverse veins. Spikes small, consisting of about 3 to 6 flowers, at some distance from each other.

In ponds, streams, and ditches, throughout Europe and central and Russian Asia, except the extreme north. Common in Britain. *Fl. summer*.

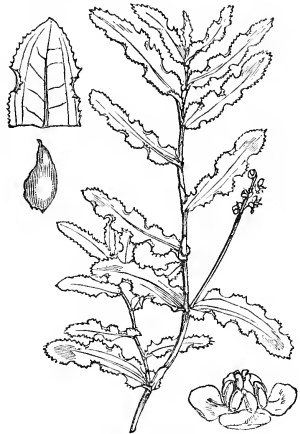


Fig. 952.

7. Opposite Pondweed. *Potamogeton densus*, Linn.
(Fig. 953.)

(Eng. Bot. t. 397.)

Readily known by its numerous short leaves, all opposite, and arranged in two rows on opposite sides of the stem; they are all submerged and thin, broadly lanceolate, 6 to 9 lines long, folded and clasping the stem at their base, with a strong midrib and 2 fainter parallel nerves, connected by a few transverse veins. Stipules only under the peduncles or branches. Peduncles very short, turned down after flowering, bearing a head of 2 or 3 flowers only. Ripe carpels rather large, rounded, and smooth.

In shallow pools, and ditches, all over Europe, except the extreme north. Common in Britain. *Fl. summer*.



Fig. 953.

8. Slender Pondweed. *Potamogeton pusillus*, Linn.
(Fig. 954.)

(Eng. Bot. t. 215, *P. compressus*, t. 418, *P. gramineus*, t. 2253,
P. trichoides, Bab. Man.)

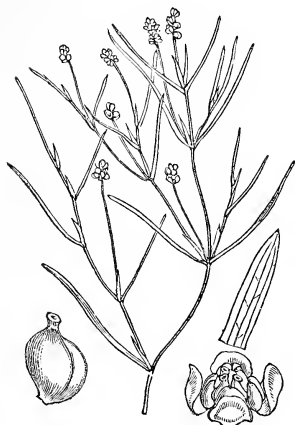


Fig. 954.

Distinguished from all the preceding species by the thread-like stems, and very narrow-linear leaves, like those of *Zannichellia* or *Ruppia*, and from the following by the scarious sheathing stipules, always observable in the axils of those leaves at least which are under the branches or peduncles. Leaves veined as in the *Fennel P.*, 1 to 3 inches long and very seldom a line broad. Peduncles slender, with a short, close spike of small flowers. Nuts small, ovoid, almost pointed, with a more or less strongly marked dorsal rib.

In pools, ditches, and still waters, fresh or salt, almost all over the world. Common in Britain. *Fl. summer.* The *P. acutifolius* (Eng. Bot. Suppl. t. 2609) and the *P. zosterifolius* (Suppl. t. 2685) appear to represent a robust variety of this species, or the latter perhaps a state of the *various-leaved P.*, without the upper floating leaves. In both the leaves are 3-nerved only.

9. Fennel Pondweed. *Potamogeton pectinatus*, Linn.
(Fig. 955.)

(Eng. Bot. t. 323. *P. filiformis*, Brit. Fl.)

Stems thread-like, with very narrow, grass-like leaves, usually 2 or 3 inches long, most of them dilated at the base into a rather long sheath, which is scarious at the edge and often projecting at the top into two small scarious lobes, these scarious edges supposed to be stipules adhering to the base of the leaf; the sheathing stipules of the other species either wholly wanting or very rare under the peduncles. The midrib of the leaf sometimes separates into longitudinal, netted veins, only visible under a magnifying-glass, and there are usually 2

faint longitudinal nerves at some distance from it. Peduncles usually bearing several clusters of 2 or 3 flowers, at some distance from each other, forming a slender interrupted spike, rarely reduced to a single small terminal cluster. Nut as in the *slender P.*

In pools, ditches, and still waters, fresh or salt, almost all over the world. Generally distributed over Britain. *Fl.* summer.

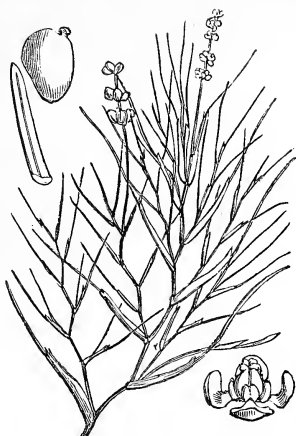


Fig. 955.

LXXVIII. THE ALISMA FAMILY. ALISMACEÆ.

Marsh or water plants, with radical leaves and leafless flower-stems (except in *Scheuchzeria*). Flowers in terminal umbels, panicles, or racemes. Perianth of 6 segments, either all similar, or 3 outer small and sepal-like, and 3 inner ones larger and petal-like. Stamens 6, 9, or indefinite. Ovary of 3, 6, or many carpels, either distinct from the first or separable when in ripe fruit, each with 1, 2, or many ovules. Seeds consisting, within the testa, of a homogeneous mass, usually considered as an undivided embryo without albumen.

The genera are not numerous, but several of them dispersed over the greater part of the world.

Perianth-segments all nearly equal, large and coloured.

Flower-stem tall, with a large terminal umbel. . . 1. BUTOME.

Perianth-segments 3 small and herbaceous, 3 large and coloured. Flowers opposite or whorled, in a terminal raceme, umbel, or panicle.

Carpels and stamens numerous. Leaves sagittate . . 2. ARROWHEAD.

Carpels numerous. Stamens 6. Leaves ovate or narrow . . 3. ALISMA.

Carpels 6. Stamens 6. Leaves ovate or oblong . . 4. DAMASONIUM.

Perianth-segments all small and slightly coloured. Flowers alternate, in a raceme or spike.

Carpels 3, distinct. Stem leafy, rush-like 5. SCHEUCHZERIA.

Carpels 3, united till they ripen. Leaves linear, all radical 6. TRIGLOCHIN.

I. **BUTOME.** BUTOMUS.

A single species, distinguished from *Alisma* as a genus, or by some botanists as an independent family, chiefly on account of the ovary, which has several ovules in each carpel.

1. Common Butome. *Butomus umbellatus*, Linn.

(Fig. 956.)

(Eng. Bot. t. 651. *Flowering Rush*.)

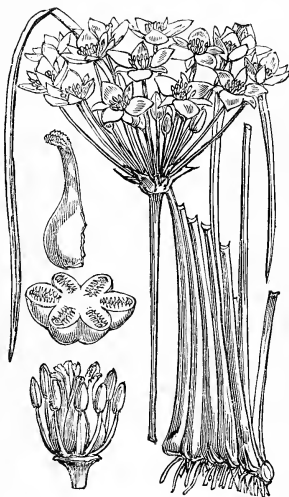


Fig. 956.

A perennial, with a thick, creeping rootstock, and long, erect, sedge-like triangular radical leaves, broad and sheathing at the base. Flower-stem leafless, 2 to 4 feet high, thick and rush-like, bearing a large umbel of showy, rose-coloured flowers, with 3 lanceolate, thin bracts at its base. Pedicels 3 to 4 inches long, often 20 to 30 in the umbel. Perianth full an inch diameter, of 6 ovate, spreading, nearly equal segments. Stamens 9. Carpels 6, erect, tapering into short styles, each with numerous minute seeds.

In watery ditches, and still waters, over the greater part of Europe and Russian Asia, except the extreme north. Dispersed over central and southern England and Ireland, but believed to be introduced only into northern England and southern Scotland. *Fl. summer*.

II. **ARROWHEAD.** SAGITTARIA.

Aquatic herbs, differing from *Alisma* in their unisexual flowers, the males with numerous stamens, the females with very numerous small carpels in a dense head.

Besides the common species, there are several from North and South America, and eastern Asia.

1. **Common Arrowhead.** *Sagittaria sagittifolia*, Linn.

(Fig. 957.)

(Eng. Bot. t. 84.)

A perennial, with a creeping rootstock, forming bulb-like tubers. Leaves radical, rising out of the water on very long stalks; the blade 6 to 8 inches long, sagittate; the lobes of the base nearly as long as the terminal one, all pointed, but varying much in width. Flower-stem leafless, erect, longer than the leaves, bearing in its upper part several distant whorls of rather large, white flowers; the 3 inner segments of the perianth twice as long as the 3 outer green ones; the upper flowers usually males, on pedicels $\frac{1}{2}$ to 1 inch long; the lower ones females, on shorter pedicels.



Fig. 957.

In watery ditches, and shallow ponds and streams, dispersed over the greater part of Europe and central and Russian Asia to the Arctic regions. Represented in North America by a slight variety now said to be a distinct species. In Britain, limited to England and Ireland, with the exception of a single station near Paisley, in Scotland. *Fl. summer and autumn.*

III. **ALISMA.** ALISMA.

Aquatic herbs, erect or rarely floating, with radical, long-stalked leaves; the flowers either in a terminal umbel, with or without whorls of pedicellate flowers below it, or in a panicle with whorled branches each bearing a similar umbel. Perianth of 3 outer, small, herbaceous segments, and 3 much larger inner ones, petal-like, and very delicate. Stamens 6. Carpels numerous, small, and 1-seeded, either arranged in a ring round the axis, or irregularly in a globular head.

A genus now known to comprise a considerable number of species,

chiefly American, but some of them widely distributed over nearly the whole world.

- Flowers numerous, in a loose panicle. Carpels forming a ring round the axis of the flower 1. *Common A.*
 Flowers few, in a single umbel. Carpels irregularly arranged in a globular head.
 Stems erect or creeping. Carpels with 4 or 5 prominent ribs 2. *Lesser A.*
 Stems floating. Carpels with 12 to 15 slender ribs 3. *Floating A.*

1. Common Alisma. *Alisma Plantago*, Linn. (Fig. 958.)

(Eng. Bot. t. 837. *Water Plantain*.)



Fig. 958.

Rootstock perennial, becoming almost bulbous by the thickened sheathing bases of the leafstalks. Leaves radical, varying from ovate to narrow-lanceolate. Flower-stem 1 to 3 feet high, with whorled branches, unequal in length, forming a loose, pyramidal panicle. Flowers rather small, of a pale rose-colour, on long whorled pedicels. Fruit of 20 to 30 carpels, arranged in a single ring round a broad, flat, central axis.

In watery ditches, ponds, and edges of streams; common in Europe and central and Russian Asia, and North America, extending to the Arctic regions, and reappearing in Australia. Abundant in Britain, excepting the north of Scotland. *Fl. all summer.*

2. Lesser Alisma. *Alisma ranunculoides*, Linn. (Fig. 959.)

(Eng. Bot. t. 326.)

The leaves and peduncles form annual tufts, but will occasionally emit runners for a succeeding year. Leaves narrow-lanceolate, or sometimes reduced to a linear leafstalk. Flower-stems, in the ordinary state, simple, with a single terminal umbel, or rarely a second whorl below it. Flowers larger than in the *common A.*, sometimes near an inch diameter. Carpels irregularly arranged in a globular head in the centre of the flower.

In wet ditches, bogs and marshes, over the greater part of Europe, from Spain to southern Sweden, but rare in the east. In Britain, as widely dispersed as the *common A.*, but not near so frequent. *Fl. summer and autumn.* Occasionally the flowering-stem bends down, and forms fresh rooting and leafy tufts at each whorl of flowers. This state has been described as a species, under the name of the *creeping A.* (*A. repens*, Eng. Bot. Suppl. t. 2722.)



Fig. 959.

3. Floating Alisma. *Alisma natans*, Linn. (Fig. 960.)

(Eng. Bot. t. 775.)

Very near the creeping varieties of the *lesser A.* Stems slender, and floating on the surface of the water, producing at every node a tuft of small ovate or oblong, stalked leaves, and 2 or 3 flowers like those of the *lesser A.*, whilst the radical leaves of the original tuft are all reduced to a linear leafstalk, scarcely dilated towards the top. Carpels in a globular head, like those of the *lesser A.*, but much more pointed, and marked with 12 to 15 slender longitudinal ribs.

In ponds and still waters, in western and some parts of central Europe; not observed in southern Europe, and extending northward only to Denmark and western Scandinavia. In Britain, scattered over a few localities in western England, and more plentiful in western Ireland. *Fl. summer and autumn.*



Fig. 960.

IV. **DAMASONIUM.** DAMASONIUM.

Herbs, only differing from *Alisma* in the carpels, which are few, larger, usually 2-seeded, and cohere by the base to the central axis of the flower.

Besides the European species, the genus comprises two others from Australia and California.

1. **Star Damasonium.** *Damasonium stellatum*, Pers.

(Fig. 961.)

(*Alisma Damasonium*, Eng. Bot. t. 1615. *Actinocarpus*, Brit. Fl.)

Fig. 961.

A tufted, glabrous annual. Leaves all radical, on long stalks, ovate or oblong, often cordate at the base. Flower-stems erect, from 3 or 4, to 8 or 9 inches high, usually bearing 1 terminal umbel, and 1, 2, or 3 whorls of rather small flowers lower down. Inner segments of the perianth or petals very delicate, white, with a yellow spot at the base. Carpels 6, tapering into a long point, and radiating horizontally, like a star.

In watery ditches, and pools, in western and southern Europe, and west-central Asia, but not extending into Germany or Scandinavia. In Britain, only in some of the southern and eastern counties of England. *Fl. summer.*

V. **SCHEUCHZERIA.** SCHEUCHZERIA.

A single species, distinguished from the preceding genera as well by its habit and inflorescence, as by the smaller, more herbaceous perianth, on which account this and the following genus are often separated as a family, under the name of *Juncagineæ*.

1. **Marsh Scheuchzeria.** *Scheuchzeria palustris*, Linn.

(Fig. 962.)

(Eng. Bot. t. 1801.)

A rush-like perennial, with a creeping rootstock, and an erect stem

about a foot high. Leaves few, linear, sheathing at the base, then narrowed, and nearly cylindrical; the lower ones often longer than the stem; the upper ones passing into short, sheathing floral bracts. Flowers few, rather small, on pedicels about 6 lines long, forming a short, loose terminal raceme. Perianth slightly coloured, of 6 spreading or reflexed segments. Stamens 6. Carpels 3, rarely 4 to 6, near 3 lines diameter when ripe, opening by a longitudinal slit, and containing 1 or 2 seeds.

In bogs and peaty marshes, in northern and Arctic Europe, Russian Asia, and North America, and here and there in the mountainous districts of central Europe. In Britain, only in a few bogs in northern England, at Bomere, in Shropshire, and at Methuen, near Perth. *Fl. summer, rather early.*



Fig. 962.

VI. **TRIGLOCHIN.** TRIGLOCHIN.

Tufted herbs, with linear, semi-cylindrical radical leaves, and leafless flower-stems, bearing a slender raceme or spike of small greenish flowers without bracts. Perianth of 6 nearly equal segments. Stamens 6. Ovary and fruit of 3 or 6 one-seeded carpels, each bearing a separate, small feathery stigma, all united at first round a central axis, but separating from it when ripe.

A small genus, chiefly maritime, but widely distributed over the globe.

- | | |
|--|--------------------|
| Ripe fruit linear, with 3 carpels | 1. <i>Marsh T.</i> |
| Ripe fruit ovoid or oblong, with 6 carpels | 2. <i>Sea T.</i> |

1. **Marsh Triglochin.** *Triglochin palustre*, Linn. (Fig. 963.)

(Eng. Bot. t. 366. *Arrow-grass.*)

The tufted stock emits a few slender, creeping runners. Leaves slender, but rather succulent, varying from 2 or 3 to 6 or 8 inches

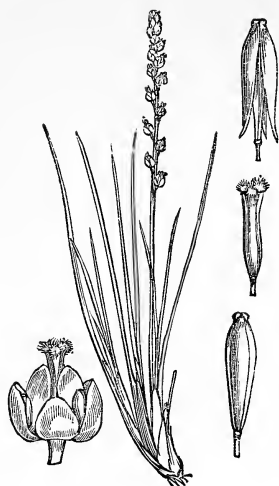


Fig. 963.

in length, dilated and sheathing at the base. Flower stems from 6 inches to a foot high, bearing in their upper half a slender spike of small yellowish-green flowers, which are at first sessile, but as the fruiting advances the pedicels lengthen to 1 or 2 lines. Perianth-segments broadly ovate, the feathery stigmas just appearing above them. After they fall off, the fruit lengthens to about 3 lines by less than a line broad, tapering at the base; when ripe it separates from the base upwards into 3 carpels, leaving a central axis.

In wet meadows, and marshes, and on the shallow edges of streams, more especially in maritime districts, in Europe, central and Russian Asia, and North America, extending from the Mediterranean to the Arctic regions. Common in Britain. *Fl. all summer.*

2. Sea Triglochin. *Triglochin maritimum*, Linn. (Fig. 964.)

(Eng. Bot. t. 255.)



Fig. 964.

Very near the *marsh T.*, but usually rather stouter, with more succulent leaves, the flowers nearly similar; but even in that state the ovary is broader, with 6 cells, and the ripe fruit is not more than 2 lines long, more than a line broad, and divides into 6 carpels.

In Europe, generally more restricted to the vicinity of the sea than the *marsh T.*, but equally abundant with that species in the salt-marshes of the northern hemisphere, and in central Asia it ascends also high up in mountain-ranges. Common in Britain. *Fl. from spring till late in autumn.*

LXXIX. THE HYDROCHARIS FAMILY. HYDROCHARIDEÆ.

Aquatic herbs, with undivided leaves, and mostly diœcious flowers, enclosed when young in an involucre or *spatha* of 1 to 3 leaves or bracts. Perianth of 3 or 6 segments, either all petal-like or the 3 outer ones smaller and herbaceous, with a tube adherent to the ovary at its base in the females, without any tube in the males. Stamens in the males 3 to 12. Ovary in the females inferior, 1-celled, with 3 parietal placentas, or divided into 3, 6, or 9 cells. Styles 3, 6, or 9, with entire or 2-cleft stigmas. Fruit small, ripening under water, indehiscent. Seeds several, without albumen.

A small Order, widely diffused over the globe.

Stem floating and branched, with small opposite or whorled leaves. Female perianth-tube long and thread-like.

Stigmas 3 1. ELODEA.

Stem root-like, with floating tufts of orbicular leaves. Female perianth-tube short, on a slender pedicel. Stig-

mas 6 2. FROGBIT.

Stem scarcely any. Leaves tufted, succulent, radical. Fe-

male perianth-tube short, on a stout pedicel. Stigmas 6 3. STRATIOTES.

I. ELODEA. ELODEA.

Stems submerged, branched, and leafy. Flowers sessile, the males with 9 stamens, the females with a long, thread-like perianth-tube. Style adherent to the tube, with 3 notched or lobed stigmas. Ovary 1-celled, with 3 parietal placentas.

A small genus, exclusively American.

1. Canadian Elodea. *Elodea canadensis*, Rich. (Fig. 965.)

(*Anacharis Alsinastrum*, Bab. Man.)

A dark green, much branched perennial, entirely floating under water. Leaves numerous, opposite or in whorls of 3 or 4, sessile, linear-oblong, transparent, 3 or 4 lines long. Female flowers, the only ones known in this country, sessile in the upper axils, in a small, 2-lobed *spatha*; the slender perianth-tube often 2 or 3 inches long, so as to attain the surface of the water, where it terminates in 3 or 6 small, spreading segments. Male flowers unknown as yet in this country, and seldom observed anywhere.



Fig. 965.

In ponds, canals, and slow streams, abundant in North America, and probably introduced from thence into Britain, where it was first observed in 1847, in Yorkshire, Leicestershire, and near Berwick and Edinburgh. It has since spread with great rapidity over many parts of England, especially in the canals of Lincolnshire and Cambridgeshire. *Fl.* summer and autumn.

II. **FROGBIT.** HYDROCHARIS.

A single species, distinguished as a genus from *Stratiotes* and others more by its habit than by any very marked characters in the flower.

1. Common Frogbit. *Hydrocharis Morsus-ranæ*, Linn.

(Fig. 966.)

(Eng. Bot. t. 808.)



Fig. 966.

Stems floating, resembling the runners of creeping plants, with floating tufts of radical leaves, peduncles, and submerged roots. Leaves stalked, orbicular, entire, cordate at the base, rather thick, about 2 inches diameter. Peduncles of the male plant rather short, bearing 2 or 3 rather large flowers on long pedicels, enclosed at the base in a spatha of 2 thin bracts. Outer segments of the perianth pale green, shorter and narrower than the inner white ones. Stamens 3 to 12. Female spatha sessile among the leaves; the flowers like the males, but with the pedicel enlarged at the top into a short perianth-tube enclosing the ovary. Styles 6, with 2-cleft stigmas. Fruit dry, 6-celled, with several seeds.

In ditches and ponds, dispersed over Europe and central and Russian Asia, but not extending to the Arctic Circle. Occurs in many

parts of England and Ireland, but in some cases introduced, and not indigenous in Scotland. *Fl. summer.*

III. STRATIOTES. STRATIOTES.

A single species, with the flowers nearly of *Frogbit*, but a succulent fruit, and a very different habit.

1. Water Stratiotes. *Stratiotes aloides*, Linn. (Fig. 967.)

(Eng. Bot. t. 379. *Water-soldier*.)

Rootstock creeping in the mud, producing at the bottom of the water tufts of sessile, long and narrow, more or less succulent leaves, bordered by small, pointed teeth. Peduncles rising from among the leaves to a few inches above the water, much thickened at the top, bearing a spatha of 2 bracts, about an inch long. Male flowers several in the spatha, stalked, much like those of the *Frogbit* but rather larger, with usually 12 or more stamens. Female flowers solitary, and sessile in the spatha, with a rather long tube, swollen below the middle. Ovary and stigmas nearly as in *Frogbit*, but the fruit is ovoid and somewhat succulent.

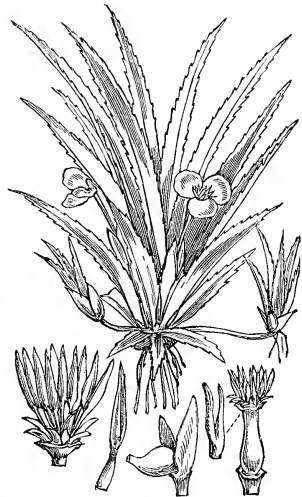


Fig. 967.

In lakes and watery ditches, dispersed over Europe and Russian Asia, except the extreme north. Common in the fens of eastern England, occurs also in Lancashire and Cheshire, and in some parts of Ireland, besides many ponds in England and Scotland into which it has been introduced. *Fl. summer.*

LXXX. THE ORCHID FAMILY. ORCHIDACEÆ.

Perennial herbs, with the roots or stock often thickened into tubers, entire and parallel-nerved leaves, and irregular flowers,

either solitary or in spikes, racemes, or panicles, each one in the axil of a bract. Perianth superior, irregular, with 6 usually petal-like segments; the 3 outer ones, called *sepals*, and 2 of the inner ones, called *petals*, often nearly alike; the third inner one, called the *lip* or *labellum*, differing from the others in shape or direction. Opposite to the lip, in the axis of the flower, is the *column*, consisting of 1 or rarely 2 stamens, combined with the pistil; the 2-celled anther or anthers being variously situated on the style itself. Pollen rarely granular, more frequently cohering into 1 or 2 pairs of oblong or globular *pollen-masses*, tapering at one end into a point. Ovary inferior, 1-celled, with 3 parietal placentas. Capsule 3-valved, with innumerable minute seeds, resembling fine sawdust.

A very extensive Order, spread over all parts of the globe. Our own species, and generally those of temperate regions, are terrestrial, but a large proportion of the tropical ones are *epiphytes*, growing upon the stems and branches of trees, but without penetrating into their tissue. Numbers of these are now becoming well known, having been of late years extensively cultivated in our hothouses for the singularity of the forms assumed by the flowers, as well as for the great beauty of some of them. The genera are distinguished chiefly by the form and relative arrangement of the anther-cells, the pollen-masses, and the stigma, and the shape and direction of the lip, characters which, however essential, are in many cases as difficult to describe clearly as to observe accurately, especially in dried specimens. For the beginner, therefore, I have endeavoured in the following table to select such prominent features as may guide him to the British species, independently of the more accurate technical characters, which may be reserved for subsequent study.

Plants without any leaves, except short scales.

Lip with a spur underneath. Flowers few, rather large 8. EPIPOGIUM.

Lip without a spur. Flowers small.

Plant green. Flowers white, in a spirally-twisted spike 9. SPIRANTH.

Plant and flowers brown or yellowish-white. Flowers in a raceme.

Lip entire, not so long as the sepals 3. CORALROOT.

Lip 2-cleft, longer than the sepals 7. NEOTTIA.

Plant with 1, 2, or more green leaves.

Perianth with a spur or pouch at the base of the lip 11. ORCHIS (*and*
2. HABENARIA).

Perianth without any spur or pouch.*

Lip hanging, longer than the sepals, very narrow or divided into narrow lobes. Flowers yellowish-green.

Stem with 2 opposite, broad leaves. Flowers pedicellate. Rootstock fibrous 6. *LISTERA*.

Stem leafy at the base. Flowers sessile. Rootstock tuberous.

Sepals arching over the column. Lobes of the lip linear 13. *ACERAS*.

Sepals spreading. Lobes of the lip oblong 15. *OPHRYS*.

Lip hanging, very convex or large, brown or spotted.

Flowers 1 or 2 only, very large. Lip inflated, above an inch long 16. *CYPRIPED*.

Flowers several. Lip convex, not above half an inch long 15. *OPHRYS*.

Lip erect or spreading, not longer than the sepals, concave or flat.

Flowers rather large, in a loose, leafy spike. Stem leafy, usually a foot high or more.

Flowers pedicellate, drooping 4. *EPIPACTIS*.

Flowers sessile, erect 5. *CEPHALANTHERA*.

Flowers small (white or greenish-yellow). Stem seldom above 6 inches high.

Flowers pedicellate, erect. Stem bulbous at the base.

Sepals broad-lanceolate, about 1 line long 1. *MALAXIS*.

Sepals narrow-linear, fully 2 lines long 2. *LIPARIS*.

Flowers sessile, horizontal or drooping. Stem not bulbous.

Flowers greenish-yellow, all round the spike. Rootstock tuberous 14. *HERMINIUM*.

Flowers greenish-white. Spike one-sided, straight. Rootstock creeping, fibrous 10. *GOODYERA*.

Flowers white. Spike one-sided, spiral. Rootstock almost tuberous 9. *SPIRANTH*.

I. **MALAXIS.** MALAXIS.

A single species, distinguished as a genus from *Liparis* by the proportion of the petals, and by the pollen-masses, which are club-shaped, in 2 pairs, both suspended from a gland which terminates the column.

* A single specimen has been occasionally found of species of *Orchis* and *Habenaria*, in which the flowers are all deformed, without any spur, but such instances are very rare.

1. Bog Malaxis. *Malaxis paludosa*, Sw. (Fig. 968.)

(Ophrys, Eng. Bot. t. 72.)

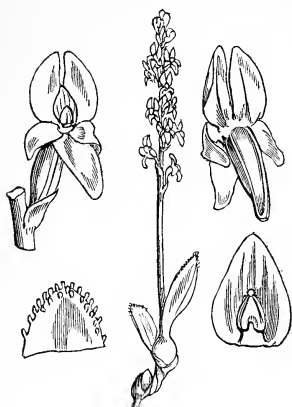


Fig. 968.

A delicate plant, of 3 or 4 inches in height, the rootstock producing a small solid bulb out of the ground like many exotic epiphytes, and 3 or 4 ovate or oblong radical leaves. Flowers very small, of a greenish yellow, in a loose, slender raceme. Sepals ovate or broadly lanceolate, about a line long, two of them erect, the third turned down; pedicels similar, but not half the size, and spreading laterally. Lip erect, shorter than the sepals, but longer than the petals, ovate, concave at the base, where it embraces the very short column.

In spongy bogs, in northern Europe and Russian Asia, from the north of France to the Arctic regions, and in some mountain-districts in central Europe. Spread over the greater part of Britain, but very sparingly, and always difficult to find. *Fl. summer, rather late.*

II. **LIPARIS.** LIPARIS.

Delicate herbs, with radical leaves, and small, greenish-yellow flowers, in a terminal raceme. Sepals and petals nearly alike. Lip much broader, erect or spreading and entire. Column erect or curved, with a lid-like terminal anther; the 2 pairs of pollen-masses attached by their summits, but spreading laterally into the 2 anther-cells.

Besides the European species, the genus contains a considerable number from the warmer regions of both the new and the old world, several of them true epiphytes.

1. Two-leaved Liparis. *Liparis Loeselii*, Rich. (Fig. 969.)(Ophrys, Eng. Bot. t. 47. *Sturmia*, Bab. Man.)

The stock forms a small bulb for the following year by the side of the stem. Leaves 2, about half the length of the stem, narrow-oblong,

or broadly lanceolate, with a shorter outer sheath. Stem from 2 or 3 to near 6 inches high. Flowers from 3 or 4 to 8 or 10 in the raceme; the sepals and petals very narrow, about two lines long or rather more; the lip broadly ovate, erect at the base, turned back at the tip. Column much shorter.

In bogs and wet places, scattered over central Europe, from southern Scandinavia and western France to the Russian frontier. In Britain, only in Cambridge-shire and some of the neighbouring counties. *Fl. summer.*



Fig. 969.

III. **CORALROOT.** CORALLORHIZA.

Brown or yellowish herbs, without green leaves; the flowers in a loose terminal spike. Sepals and petals nearly alike, the lip larger, often with 2 lateral lobes and 2 projecting ridges on the surface. Column short, with a terminal lid-like anther, and 2 pairs of globular pollen-masses, attached horizontally.

Besides the European species, the genus comprises a small number from North America and eastern Asia.

1. **Spurless Coralroot.** *Corallorhiza innata*, Br. (Fig. 970.)

(*Ophrys Corallorhiza*, Eng. Bot. t. 1547.)

A slender plant, 6 to 9 inches high, of a light brown or pale yellow colour, slightly tinged with green in the lower part, with a few short, sheathing scales instead of leaves; the rootstock forming a number of short, thick, fleshy, club-shaped fibres, densely interwoven, and nearly white. Flowers small, of a yellowish-green; the sepals narrow-lanceolate, about 2 lines long; the petals rather shorter; the lip oblong, white, and hanging.



Fig. 970.

In moist woods, widely diffused over northern and central Europe, Russian Asia, and North America, extending from northern Italy to the Arctic regions. In Britain, only known in a few localities in Scotland. *Fl. summer.*

IV. **EPIPACTIS.** EPIPACTIS.

Herbs, with a leafy stem, and purple, brown, or whitish flowers, rarely tinged with red, in a loose raceme. Perianth spreading; the petals shorter than the sepals but otherwise similar; the lip free from the column, thick and concave at the base, the terminal portion broad and petal-like, with 2 protuberances at its base. Column short; the anther terminal; the pollen very loosely cohering in the pollen-masses.

A small genus, ranging over the temperate regions of the northern hemisphere.

Raceme long and leafy. Flowers distant, dull green or purplish 1. *Broad E.*
 Raceme rather loose but short. Sepals pale purplish-green;
 the lip white, tinged with pink 2. *Marsh E.*

1. **Broad Epipactis.** *Epipactis latifolia*, Sw. (Fig. 971.)

(*Serapias*, Eng. Bot. t. 269, *E. purpurata*, Suppl. t. 2275, *E. ovalis*,
 Suppl. t. 2884. *E. media*, Bab. Man.)

Rootstock shortly creeping, with rather thick fibres. Stem usually 2 to 3 feet high. Leaves strongly ribbed; the lower ones ovate and stem-clasping; the upper ones narrower, lanceolate, and pointed, gradually passing into the linear bracts, of which the lower ones are often longer than the flowers. Flowers pendulous, in a long, one-

sided raceme, varying in colour from green to a dingy purple. Sepals ovate-lanceolate, about 3 or 4 lines long. Petals rather smaller. Lip rather small, the lower portion very short.

In woods and shady places, dispersed over the whole of Europe and Russian Asia, except the extreme north. Not unfrequent in Britain, but often appearing only in single specimens. *Fl. summer, rather late.* The breadth of the upper leaves, and the precise form and proportions of the terminal lobe of the perianth-lip are liable to considerable variation, but the latter is always much smaller than in the *marsh E.*, and never white.



Fig. 971.

2. Marsh Epipactis. *Epipactis palustris*, Sw. (Fig. 972.)

(*Serapias*, Eng. Bot. t. 270.)

Not so tall as the *broad E.*, the leaves narrower, usually lanceolate, and the bracts all shorter than the flowers. Racemes loose, but much closer than in the *broad E.* and not one-sided; the flowers larger, slightly drooping. Sepals lanceolate, of a pale greenish-purple. Petals rather shorter, white, more or less streaked with pink at the base. Lip of the colour of the petals, but longer even than the sepals, distinctly divided into two portions, the lower one thick and half-clasping the column.

In moist and marshy places, especially in limestone districts, and near the sea, extending nearly all over Europe and Russian Asia, except the extreme north. Widely spread over Britain, and found in abundance in particular spots, yet not a common plant, and quite rare in Scotland. *Fl. summer.*



Fig. 972.

V. **CEPHALANTHERA.** CEPHALANTHERA.

Habit and foliage of *Epipactis*, but the flowers are sessile, erect, and usually larger, white or red, the petals and sepals not so spreading, the lip has no protuberances at the base of the upper portion, the column is longer, and the anther is shortly stalked.

A small European and north Asiatic genus, united by some with *Epipactis*, whilst others place it in a different tribe of *Orchids* on account of the slight difference in the position of the anther.

Flowers white or cream-coloured.

Leaves broad. Lower bracts longer than the flower, and

all longer than the ovary 1. *Large C.*

Leaves narrow. All the bracts shorter than the ovary . . . 2. *Narrow C.*

Flowers red 3. *Purple C.*

1. **Large Cephalanthera.** *Cephalanthera grandiflora*, Bab.
(Fig. 973.)

(*Serapias*, Eng. Bot. t. 271. *Epipactis*, Brit. Fl.)



Fig. 973.

Rootstock fibrous. Stem 1 to 1½ feet high. Leaves prominently veined as in *Epipactis*; the lower ones broadly ovate, the upper ones rather broadly lanceolate. Flowers rather large, of a yellowish white or cream-coloured, in a loose, leafy spike, all the bracts being longer than the ovary, and the lower ones quite leaf-like and longer than the flowers. Sepals 6 to 8 or even 9 lines long, oblong, and usually obtuse, rather open. Petals rather shorter, close over the column. Lip small, of two distinct portions, the lower one embracing the column, the terminal one recurved at the tip.

In woods and thickets, in Europe, extending eastward to the Caucasus, and northward to Denmark. In Britain, scattered over various parts of England, Ireland, and southern Scotland. *Fl.* early summer.

2. **Narrow Cephalanthera.** *Cephalanthera ensifolia*, Rich.
(Fig. 974.)

(*Serapias*, Eng. Bot. t. 494. *Epipactis*, Brit. Fl.)

Very near the *large C.*, but the leaves are narrower, the lower ones broadly oblong, the upper ones long and narrow-lanceolate; the bracts very short, mostly 1 to 2 lines long, or the lowest rarely as long as the ovary. Flowers pure white; the sepals narrower and more pointed than in the *large C.*

Stations and geographical range the same as those of the *large C.* It is more scarce in Britain, but appears to be rather more common in southern and eastern Europe. *Fl. early summer.*



Fig. 974.

3. **Red Cephalanthera.** *Cephalanthera rubra*, Rich.
(Fig. 975.)

(*Serapias*, Eng. Bot. t. 437. *Epipactis*, Brit. Fl.)

Stature and foliage of the *narrow C.* Bracts rather longer but not so long as in the *large C.* Ovaries and axis of the raceme minutely downy. Flowers rather larger than in the *narrow C.*, of a pink red, with a narrow, white lip.

Stations and geographical range of the last two species, and not uncommon in southern and eastern Europe. In Britain extremely rare, having been only seen by very few botanists in Gloucestershire, and possibly in one or two other counties of England. *Fl. summer.*



Fig. 975.

VI. **LISTERA.** LISTERA.

Herbs, with 2 leaves at some distance from the ground, placed so near together as to appear opposite, and small, green flowers in a slender raceme. Sepals broader than the petals, otherwise all nearly alike, short and spreading; the lip longer, linear, and 2-cleft. Anther fixed by its base in a cavity at the top of the short column; the pollen as in *Epipactis*.

A small European, north Asiatic, and North American genus, readily known among the small-flowered, spurless *Orchids* by the foliage.

Leaves ovate, narrowed at the base, 2 to 4 inches long . 1. *Twayblade* *L.*
 Leaves broad or cordate at the base, not an inch long . 2. *Heart-leaved* *L.*

1. **Twayblade** *Listera.* *Listera ovata*, Br. (Fig. 976.)

(*Ophrys*, Eng. Bot. t. 1548. *Twayblade*.)



Fig. 976.

The rootstock has a mass of clustered, thickish fibres, but not near so succulent as in the *Bird's-nest* *Neottia*. Stem 1 to near $1\frac{1}{2}$ feet high, with 2 or 3 sheathing scales at the base, and at about 6 inches from the ground a pair of broadly ovate, green leaves, 2 to 4 inches long. Raceme rather long and slender. Sepals and petals about $1\frac{1}{2}$ to near 2 lines long; the lip twice as long, ending in two linear lobes.

In moist pastures, and woods, throughout Europe and Russian Asia, except the extreme north. Frequent in Britain. *Fl.* spring and summer.

2. **Heart-leaved** *Listera.* *Listera cordata*, Br. (Fig. 977.)

(*Ophrys*, Eng. Bot. t. 358.)

A much smaller and more slender plant than the *Twayblade* *L.*, usually about 6 inches high. Leaves seldom above $\frac{3}{4}$ inch long, very

broad, and sometimes slightly cordate at the base. Flowers very small, in a short raceme; the lip linear, 2-cleft, with 2 minute teeth at its base.

On mountain heaths, in northern and Arctic Europe, Asia, and America, extending southward to the Alps and the Caucasus. In Britain, confined to Scotland, the north of England, and some parts of Ireland, where the stem is occasionally drawn up to two or three times its ordinary height. *Fl. summer.*



Fig. 977.

VII. **NEOTTIA.** NEOTTIA.

A genus of very few European and north Asiatic species, distinguished from *Listera* by the brown stems with sheathing scales instead of leaves, and by a rather longer column in the flower.

1. **Bird's-nest Neottia.** *Neottia Nidus-avis*, Linn. (Fig. 978.)

(*Ophrys*, Eng. Bot. t. 48. *Listera*, Brit. Fl.)

The rootstock consists of a dense mass of thick, rather succulent fibres. Stem a foot high or rather more, of a pale-brown colour, as well as the few loose sheathing scales which replace the leaves. Spike rather dense, 3 or 4 inches long, with a few distant flowers below it, all dingy-brown. Sepals broadly ovate, almost acute, about $2\frac{1}{2}$ to 3 lines long; petals more rounded; lip twice as long, deeply cleft at the extremity into 2 oblong, diverging lobes.

In woods, dispersed over the whole of Europe, except the extreme north, extending eastward to the Caucasus, although never a very common plant. In Britain, it is found in many parts

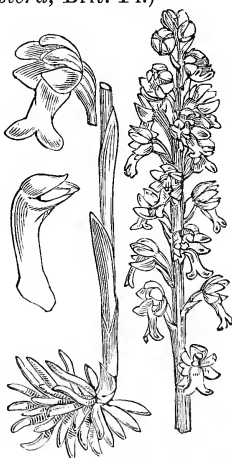


Fig. 978.

of England, Ireland, and southern and central Scotland. *Fl. spring and early summer.*

VIII. **EPIPOGIUM.** EPIPOGIUM.

A single species, leafless like *Coralroot* and *Neottia*, but with a very different spurred flower.

1. Leafless Epipogium. *Epipogium aphyllum*, Sw.

(Fig. 979.)

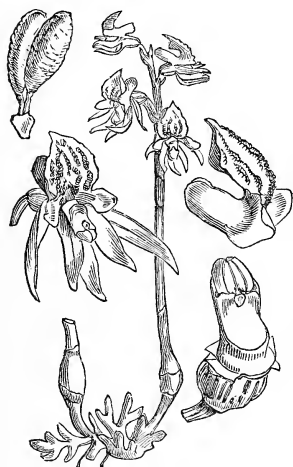


Fig. 979.

The rootstock produces a number of short, thick, fleshy branches, like those of the *Coralroot*. Stem about 6 inches high, of a pale colour, with a few short, sheathing bracts. Flowers 3 or 4 in the raceme, rather large, of a pale yellowish hue, pendulous, with the lip upwards. Sepals and petals narrow-lanceolate; lip large, ovate, somewhat concave, marked with raised dots on the surface, with an oblong lobe on each side at its base, and a thick, projecting spur underneath. Column short, with a shortly stalked terminal anther.

Among rotten leaves, in woods and shady places, scattered over Europe and central and Russian Asia, but everywhere very scarce. In Britain, discovered only a few years since at Tedstone Delamere, near Bromyard, in Herefordshire, by Mrs. W. A. Smith. *Fl. August.*

IX. **SPIRANTH.** SPIRANTHES.

Rootstock producing a few oblong tubers or thickish fibres. Stem leafy, or sometimes the flower-stems with scales only, and radical leaves by its side. Flowers small, in a more or less spirally-twisted spike. Sepals and petals nearly alike, erect or only spreading at the tips; the lateral sepals oblique, covering the base of the lip; the upper sepal cohering with the petals. Lip oblong, concave at the base,

dilated and spreading at the extremity. Column arching, with the anther attached to the back.

An extensive genus, spread over the greater part of the globe, and readily known by the spirally twisted spikes.

Leaves radical, ovate, or oblong; the stems bearing short scales

only 1. *Common S.*

Leaves all narrow, near the base of the flowering stem.

Spike 2 to 3 inches long, the flowers in one row 2. *Summer S.*

Spike dense, 1 to 1½ inches long, the flowers in three rows. 3. *Drooping S.*

1. Common Spiranth. *Spiranthes autumnalis*, Rich.

(Fig. 980.)

(*Ophrys*, Eng. Bot. t. 541. *Neottia*, Brit. Fl. *Lady's-tresses*.)

The rootstock produces every year 2 or 3 thick, oblong tubers, and a tuft of 3 or 4 broadly ovate or oblong, spreading radical leaves, seldom above an inch long. Flowering stems by the side of the tuft of leaves, 6 to 8 inches high, green, with short, sheathing, pointed scales, very seldom growing out into very short, linear leaves. Flowers white, with a sweet smell of almonds, in a rather close spiral spike of about 2 inches, all diverging horizontally to one side, whilst the bracts remain erect on the opposite side.

On dry, hilly pastures, all over Europe, except the extreme north, extending eastward to the Caucasus. Abundant in most parts of England, but not further north than Westmoreland and Yorkshire, and occurs also in Ireland. *Fl. autumn.*



Fig. 980.

2. Summer Spiranth. *Spiranthes æstivalis*, Rich.

(Fig. 981.)

(Eng. Bot. Suppl. t. 2817. *Neottia*, Brit. Fl.)

Rootstock more horizontal than in the *common S.*, with longer, more cylindrical tubers. Leaves radical, or on the flower-stem near the



Fig. 981.

base, narrow-lanceolate or linear. Stem rather taller than in the *common S.*, and the flowers rather larger.

In bogs and marshes, chiefly in southern Europe, extending over the greater part of France, but scarcely into central Germany. The only known British stations are in a bog in the New Forest, in Hampshire, and in the Channel Islands. *Fl. late in summer.*

3. Drooping Spiranth. *Spiranthes cernua*, Rich. (Fig. 982.)

(Bot. Mag. t. 5277. *S. gemmipara*, Lindl.)



Fig. 982.

Rootstock producing a cluster of thin cylindrical tubers. Stem leafy, attaining 6 to 9 inches. Lower leaves at the base of the stem lanceolate or spathulate, 2 to 3 inches long, spreading, the upper ones smaller, erect, sheathing at the base. Spike dense, 1 to 2 or even nearly 3 inches long, the flowers white, closely packed in 3 rows, much larger than in the other two species, with a broader lip.

In bogs and marshes, having a very extensive range in North America, but unknown in Europe, except in a single station in Ireland, in a bog at Bearhaven, near Castletown, Cork county. *Fl. August and September.* In the above-quoted article of the 'Botanical Magazine' will be found a full history of

this species, and of the reasons which have induced us to give up the idea, adopted from Lindley in the first edition of this Handbook, that it is peculiar to Ireland and distinct from the North American *S. cernua*.

X. **GOODYERA.** GOODYERA.

Very near to *Spiranth*, but the spike is not spiral, and the lip does not embrace the column, has no callosities at the base, and is contracted at the top into a recurved point.

The species are very few, all from the northern hemisphere, and generally from high latitudes.

1. **Creeping Goodyera.** *Goodyera repens*, Br. (Fig. 983.)

(*Satyrium*, Eng. Bot. t. 289.)

Rootstock shortly creeping, with a few thick fibres. Flowering stems 6 inches to near a foot high, with a few ovate stalked leaves near the base. Spike one-sided as in the common *Spiranth*, but straight, with rather smaller flowers of a greenish-white; the lateral sepals rather shorter, and more spreading than the upper sepal and petals.

In moist woods, and forests, in northern and Arctic Europe, Asia, and America, extending into the higher mountain-chains of central Europe, the Caucasus, and Altai. In Britain, confined to the Scotch Highlands. *Fl.* end of summer.



Fig. 983.

XI. **ORCHIS.** ORCHIS.

Rootstock producing each year a fleshy tuber by the side of the decaying one of the preceding year, the following year's stem shooting from the top of the new tuber. Stem leafy at the base, with a terminal spike of flowers, usually red or purple. Sepals and petals nearly equal. Lip turned downwards, usually 3 to 5-lobed, or much dilated at the extremity, and produced underneath at its base into a spur or pouch. Anther on the face of the column, with 2 erect cells converging together at the base, with an erect process, each cell containing a pollen-mass, contracted below into a short stalk, terminating in a gland.

A considerable genus, chiefly European and north Asiatic, with a very few North American species. The allied genus *Habenaria* is separated by technical characters so difficult for the beginner to

appreciate, that the species of both genera are included in the following table.

Spur of the perianth very slender, and longer than the ovary.

Flowers white, rather large, in a loose panicle. Two leaves only at the base of the stem 1. *Butterfly H.*

Flowers usually red, rather small, in a dense spike.

Leaves several, narrowed.

Tubers of the rootstock entire. Spike ovate or pyramidal, very dense 9. *Pyramidal O.*

Tubers lobed or divided. Spike cylindrical, at length rather loose 10. *Fragrant O.*

Spur from half the length to about the length of the ovary.

Sepals all converging and arching over the column and petals in the form of a helmet. Tubers entire.

Flowers few, in a loose spike. Lip broadly and shortly 3-lobed 1. *Green-winged O.*

Flowers numerous, in a dense or long spike. Lip with 2 lateral, smaller lobes, and a large 2-cleft middle one 2. *Military O.*

Sepals, at least the lateral ones, spreading. Petals, either alone or with the upper sepal, arching over the column.

Spike long or loose. Tubers entire.

Bracts 1-nerved. Upper sepal arching over the petals 4. *Early O.*

Bracts with several veins. All 3 sepals spreading 5. *Loose O.*

Spike dense. Tubers lobed.

Bracts shorter than the flowers. Lip irregularly 3-lobed 6. *Spotted O.*

Lower bracts longer than the flowers. Lip toothed or scarcely lobed 7. *Marsh O.*

Spur exceedingly short, or reduced to a small pouch or cavity.

Lip linear, 3-lobed, the middle lobe more than an inch long 8. *Lizard O.*

Lip not above a quarter of an inch long.

Spike rather loose. Flowers green, rather small, with an oblong hanging lip, rather longer than the sepals 3. *Green H.*

Spike dense, with numerous small flowers, the lip not longer than the sepals.

Flowers purple before expanding. Lip white, 4-lobed (3-lobed, with a 2-cleft middle lobe) 3. *Dwarf O.*

Flowers white. Sepals ovate. Lip 3-lobed 2. *Small H.*

Flowers greenish-yellow. Sepals and petals very narrow. Lip 3-lobed HERMINIUM.

1. **Green-winged Orchis.** *Orchis Morio*, Linn. (Fig. 984.)

(Eng. Bot. t. 2059.)

Rootstock-tubers entire. Stem seldom above 6 or 8 inches high, with a few rather narrow, almost radical leaves, and 2 or 3 loose, sheathing scales higher up. Flowers about 6 to 8, in a loose spike. Bracts thin, and rather pink, about the length of the ovary. Sepals purplish, arching over the much smaller petals and column in the form of a helmet. Lip longer than the sepals, convex, broadly and shortly 3-lobed, of a pinkish purple, pale in the middle, with darker spots. Spur very obtuse, nearly as long as the ovary.



Fig. 984.

In meadows and pastures, very common in central and southern Europe, and temperate Russian Asia, rarer towards the north although extending into southern Scandinavia. Abundant in Surrey, and some other parts of southern England, and Ireland, scarce in the rest of England, and wanting in Scotland. *Fl.* early summer.

2. **Military Orchis.** *Orchis militaris*, Linn. (Fig. 985.)

(Eng. Bot. t. 16, t. 1873, and Suppl. t. 2675. *O. purpurea* and *O. simia*, Bab. Man.)

A handsome species, 1 to 2 feet high, with entire tubers. Leaves in the lower part of the stem varying from broadly oval to oblong, usually 3 to 5 inches long. Flowers numerous, in a dense oblong spike, with short bracts. Sepals usually purple, converging over the petals and column in the shape of a helmet as in the *green-winged O.* Lip rather longer, of a pale colour, more or less spotted with purple, and 4-lobed, or, in other words, 3-lobed, with 2 lateral entire lobes and a third middle one more or less divided into 2, with a small tooth in the cleft or notch. Spur not half the length of the ovary.

In hilly pastures, and on borders of woods, dispersed over the greater part of temperate Europe and Russian Asia, chiefly in limestone districts, extending northwards to southern Scandinavia. In Britain, limited to the counties bordering on the Thames, from Berk-



Fig. 985..

shire downwards. *Fl. spring*. Among the numerous varieties observed, chiefly in the colour and precise form of the lip, the three following, often distinguished as species, have appeared in England:—
 1. *Brown O.* (*O. fusca*), with dark purple, rather obtuse sepals; the lip variegated with purple, its middle lobes broad and short. 2. *Monkey O.* (*O. tephrosanthos*, not precisely the same as the Continental variety so named), with pale purple, spotted flowers; the middle lobes of the lip long and narrow, like the lateral ones. 3. The true *military O.*, intermediate between the two others, approaching sometimes the one, sometimes the other.

3. Dwarf Orchis. *Orchis ustulata*, Linn. (Fig. 986.)

(Eng. Bot. t. 18.)



Fig. 986.

Rather a small species, seldom above 6 to 8 inches high, and remarkable for the dense spike of small flowers, the deep purple of the unexpanded ones giving it a burnt or scorched appearance. Tubers entire. Leaves few, oblong or lanceolate. Spike 1 to 2 inches long, with small bracts. Sepals deep purple, pointed, converging over the column and the very small, narrow petals. Lip white, with a few purple spots, 4-lobed, or, in other words, deeply 3-lobed, with 2 lateral lobes and the middle one divided into 2 spreading, obtuse, more or less notched lobes. Spur very short.

On dry, hilly, open pastures, in central and southern Europe, extending eastwards to the Caucasus, and northwards to southern Scandinavia. Occurs in many parts of England, but neither

in Scotland nor in Ireland. *Fl. spring or early summer*.

4. **Early Orchis.** *Orchis mascula*, Linn. (Fig. 987.)

(Eng. Bot. t. 631.)

Stem 1 to 1½ feet high, with numerous showy flowers, in a loose spike 3 to 6 inches long, varying from a bright pinkish-purple to flesh-colour or even white. Tubers entire. Leaves rather broad and often spotted. Bracts coloured, nearly as long as the ovary, with a single nerve. The upper sepal and petals converging over the ovary, but the lateral sepals spreading, or turned back. Lip scarcely longer than the sepals, often slightly downy in the centre, reflexed on each side, with 3 short lobes, the middle one the largest and more or less notched.

In moist woods, meadows, and shady places, in central and southern Europe, extending eastward to the Caucasus and northward to southern Scandinavia. Generally distributed over Britain. *Fl. spring and early summer.*



Fig. 987.

5. **Loose Orchis.** *Orchis laxiflora*, Lam. (Fig. 988.)

(Eng. Bot. Suppl. t. 2828.)

Near the *early O.*, but the leaves are narrow-lanceolate or linear; the flowers rather larger, of a rich red, in a much looser spike; the bracts broader and always more veined; and the 3 sepals are spreading or reflexed, the petals alone converging over the column.

In moist meadows, common in southern Europe, extending into central Germany and over the greater part of France. In the British Isles, confined to Jersey and Guernsey. *Fl. spring and early summer.*



Fig. 988.

6. Spotted Orchis. *Orchis maculata*, Linn. (Fig. 989.)

(Eng. Bot. t. 632.)



Fig. 989.

Tubers rather flat, and divided into 2 or 3 finger-like lobes. Stem usually about a foot high. Leaves varying from nearly ovate to narrow-lanceolate, and often marked with dark spots. Flowers in a dense oblong spike, 2 or 3 inches long, usually of a rather pale pink, but varying much in depth of colour. Bracts marked with several veins, the lowest almost always longer than the ovary, the upper ones shorter. Sepals about 3 lines long, either all or the two lateral ones only spreading, whilst the petals arch over the column. Lip broadly orbicular, either flat or the sides reflexed, usually more or less toothed and irregularly 3-lobed, variously spotted or variegated with a deeper colour, the middle lobe usually small. Spur rather slender, a little shorter than the ovary.

In meadows, pastures, and open woods, throughout Europe and Russian Asia, from the Mediterranean to the Arctic regions. Abundant in Britain. *Fl. spring and early summer.* It varies very much in the breadth of the leaves, the size of the bracts, the colour of the flower, and the shape of the lip, sometimes approaching very near to the *marsh O.*

7. Marsh Orchis. *Orchis latifolia*, Linn. (Fig. 990.)

(Eng. Bot. t. 2308.)

Very near the *spotted O.*, and by some botanists considered as a mere variety. It is usually more luxuriant, the stem more hollow, the leaves larger and not always spotted, the spike longer and more leafy, the lower bracts, and sometimes nearly all, as long as or longer than the flowers, the flowers are usually deeper-coloured and less variegated, the lip toothed only or very obscurely 3-lobed, and the spur thicker; but these characters are none of them quite constant.

With the same geographical range as the *spotted O.*, it is usually found in moister situations or richer soils. Frequent in Britain, but not so abundant as the *spotted O.* *Fl. spring and early summer.* A variety with narrower leaves, more regularly tapering from the base, has been distinguished under the name of *O. incarnata*.



Fig. 990.

8. Lizard Orchis. *Orchis hircina*, Scop. (Fig. 991.)

(*Satyrium*, Eng. Bot. t. 34.)

A stout species, 1 to 2 feet high, with entire tubers and a leafy stem. Spike dense, 4 to 6 or even 8 inches high; the flowers rather large, of a dirty greenish-white, with a disagreeable smell, and remarkable for their long, linear lip; the 2 lateral lobes short, the middle one more than an inch long, rolled inwards in the bud, entire or notched at the tip; the sepals converging over the column, and the petals small as in the *green-winged O.* and the *military O.*

Widely spread over central and southern Europe, but everywhere rather scarce, and often only in single specimens, not extending into northern Germany. In Britain, it has been found in Kent and Surrey. *Fl. summer.*



Fig. 991.

9. **Pyramidal Orchis.** *Orchis pyramidalis*, Linn. (Fig. 992.)
(Eng. Bot. t. 110.)



Fig. 992.

Tubers entire. Stem a foot high or rather more, with lanceolate leaves, usually narrow and pointed. Spike very dense, ovoid or oblong, 2 to 3 or even 4 inches long; the flowers not very large, but of a rich rose- or purplish-red, either scentless or with a disagreeable odour, and remarkable for their very slender spur, longer than the ovary, although that is long in proportion to the rest of the flower. Sepals lanceolate, spreading. Petals converging over the column. Lip broad, 3-lobed, the lobes equal or the middle one narrower.

On rather dry banks, and pastures, chiefly in limestone districts, in central and southern Europe, extending eastward to the Caucasus and northward to Denmark. Abundant in several parts of England and Ireland, and occurs in a few localities in southern Scotland. *Fl. all summer.*

10. **Fragrant Orchis.** *Orchis conopsea*, Linn. (Fig. 993.)
(Eng. Bot. t. 10. *Gymnadenia*, Brit. Fl.)



Fig. 993.

Tubers palmate as in the *spotted O.* Stem 1 to 2 feet high, with linear or narrow-lanceolate leaves. Spike oblong or cylindrical, not so dense as in the *pyramidal O.* Flowers much like those of that species, but rather smaller, sweet-scented, and the slender spur is still longer.

In heaths and pastures, throughout Europe and Russian Asia, especially in the north, extending to the Arctic regions; in the south of Europe more confined to mountain districts. Dispersed all over Britain, and very abundant in Scotland and Ireland. *Fl. all summer.* This and the last two species are occasionally removed to as many distinct genera on account of slight differences in the pollen-masses.

XII. **HABENARIA.** HABENARIA.

Foliage, inflorescence, and spurred flowers of *Orchis*, but the anther-cells, instead of converging at the base, are either parallel or more or less diverging.

An extensive genus, chiefly distributed over Asia and America. The table of species is included above in that of *Orchis*.

1. **Butterfly Habenaria.** *Habenaria bifolia*, Br. (Fig. 994.)

(*Orchis*, Eng. Bot. t. 22, and Suppl. t. 2806.)

Tubers entire. Stem 1 to 1½ feet high, with 2 rather large leaves at its base, varying from broadly ovate to oblong; the outer leaves very few, and usually reduced to sheathing scales. Flowers pure white or with a slight greenish tinge, rather large, and sweet-scented, in a loose spike from 3 to 6 or 8 inches long, with lanceolate bracts about the length of the ovary. Two lateral sepals spreading, the upper one arching over the column with the petals. Lip linear and entire, rather longer than the sepals, and usually greenish at the tip. Spur slender, twice as long as the ovary.



Fig. 994.

In moist pastures, and meadows, on grassy slopes and open places in moist woods, throughout Europe and Russian Asia, from the Mediterranean to the Arctic Circle. Generally distributed over Britain. *Fl. all summer.* It varies much in the breadth of the leaves as well as of the parts of the flower, and the extreme forms have been distinguished as species, the name of *H. chlorantha* being given to those in which the flowers are large, usually very white (although the name means 'green-flowered'), and the anther-cells much more broadly diverging at the base. But every intermediate may be observed between the broad and the narrow forms.

2. **Small Habenaria.** *Habenaria albida*, Br. (Fig. 995.)

(*Satyrium*, Eng. Bot. t. 505. *Gymnadenia*, Bab. Man.)

In stature, and its small flowers with very short spurs, this species approaches the *dwarf Orchis*, but the flowers are white, and the anthers are more like those of *Habenaria* than of *Orchis*. The rootstock



Fig. 995.

produces several thickened fibres, sometimes uniting into a deeply divided tuber. Stem 6 to 8 inches high, with a few oblong leaves. Spike dense, cylindrical, 1 to 2 inches long, with numerous small, sweet-scented flowers. Sepals concave, but open, scarcely above a line long; the lip about their length, with 3 entire lobes, the middle one the longest.

In mountain pastures, in northern and Arctic Europe, and in the great mountain-ranges of central Europe. Abundant in some of the Scotch Highlands, and extends into northern England, North Wales, and Ireland. *Fl. summer.*

3. Green Habenaria. *Habenaria viridis*, Br. (Fig. 996.)

(*Satyrium*, Eng. Bot. t. 94.)



Fig. 996.

Tubers more or less lobed. Stem 4 to 8 inches high, with a few ovate or oblong leaves, and a rather close spike of yellowish-green flowers, rather larger than in the *small H.*, but with the same very short spur or pouch. Bracts usually longer than the ovary. Sepals converging over the column and petals, about $2\frac{1}{2}$ or 3 lines long. Lip longer and hanging, oblong, with nearly parallel sides, and 3 or sometimes only 2 very short lobes at the tip.

In dry, hilly pastures, in Europe and Russian Asia, from the Mediterranean to the Arctic regions, but rather a mountain plant in the south. Frequent in Scotland, northern England, and Ireland, less so in southern England. *Fl. summer.*

XIII. **ACERAS.** ACERAS.

Flowers and habit of an *Orchis*, except that there is no spur whatever to the lip.

A genus of very few species, from Europe, Asia, and northern Africa.

1. **Man Aceras.** *Aceras anthropophora*, Br. (Fig. 997.)

(*Ophrys*, Eng. Bot. t. 29. *Man-Orchis*.)

A rather small species, seldom above 8 or 9 inches high, with entire tubers; the leaves varying from ovate to oblong or nearly lanceolate. Spike slender, 2 to 4 inches long. Flowers of a dull yellowish-green; the sepals converging over the column and petals as in the *lizard Orchis*, but very much smaller. Lip narrow-linear, twice as long as the sepals, and fancifully compared to a hanging man, two lateral lobes representing his arms, and the middle one, which is longer and 2-cleft, his body and legs.

In dry pastures, in southern Europe, more sparingly dispersed over western Germany and France. In Britain, only in eastern England. *Fl.* early summer.



Fig. 997.

XIV. **HERMINIUM.** HERMINIUM.

Small-flowered plants, nearly allied to *Orchis*, but the perianth has no spur, and the anther-cells are distant at their base, the glands of the stalks of the pollen-masses protruding below the cells.

A genus of very few species, from the high northern or alpine regions of Europe and Asia.

1. **Musk Herminium.** *Herminium Monorchis*, Br.
(Fig. 998.)

(*Ophrys*, Eng. Bot. t. 71. *Musk-Orchis*.)

A slender plant, seldom above 6 inches high, with 2 or very seldom



Fig. 998.

3, oblong or lanceolate, radical leaves. Tubers nearly globular, like those of an *Orchis*, but the new one, instead of being produced close to the stem, is formed at the end of one of the fibres proceeding from the crown, thus forming a creeping rootstock. Spike slender, with numerous, small, yellowish-green flowers. Sepals erect or scarcely spreading, and narrow. Petals narrower and rather longer, instead of being shorter as in most British *Orchids*. Lip scarcely longer, erect, hollowed into a kind of pouch at the base, but not spurred, with 3 narrow, entire lobes.

In hilly pastures, in central, northern, and Arctic Europe and Russian Asia, and in the mountains of southern Europe. Very local in Britain, chiefly in the southern and eastern counties of England, and unknown in Scotland or Ireland. *Fl. summer*.

XV. **OPHRYS.** OPHRYS.

Habit, tubers, and foliage of an *Orchis*, but the flowers have no spur, and the lip is usually very convex, resembling more or less the body of an insect. Anther-cells distant at the base, protruding below the rest of the anther in 2 distinct little pouches enclosing the glands of the pollen-masses.

A small genus, chiefly from the Mediterranean region, with a very few species spreading into central Europe. The forms assumed by the lip and its markings are so very variable that the accurate distinction of species, especially of the southern ones, is a matter of great doubt and difficulty.

Lip of the perianth as broad as long or nearly so, and scarcely longer than the sepals.

End lobe of the lip much turned under. Sepals usually pink 1. *Bee O.*

Lip slightly lobed, the edges scarcely turned under. Sepals green 2. *Spider O.*

Lip of the perianth oblong, considerably longer than the sepals 3. *Fly O.*

1. **Bee Ophrys.** *Ophrys apifera*, Huds. (Fig. 999.)

(Eng. Bot. t. 383. *O. arachnites*, Suppl. t. 2596.)

Tubers entire. Stem 9 to 18 inches high, with a few oblong or lanceolate

leaves near the base, and from 3 to 6 rather large, distant flowers, in a long, loose spike, each with a bract at least as long as the ovary. Sepals ovate, pink pale green, or white, but always tinged with pink, very spreading or reflexed. Petals smaller, usually narrow, nearly erect. Lip broad, very convex, of a rich velvety-brown, downy on the sides, smooth in the middle, and variously marked by paler lines or spots; the lobes small and all turned down, 2 lateral ones very downy, 3 terminal ones concealed under the lip, the middle one often again turned upwards, but very variable in length. Column erect, with a distinct curved beak above the anther.

In dry pastures, usually in limestone districts, in central and southern Europe, not further north than central Germany and Belgium. In Britain, chiefly in the southern and eastern counties of England, occurring more sparingly in other parts of England and in Ireland, but not in Scotland. *Fl.* early summer.

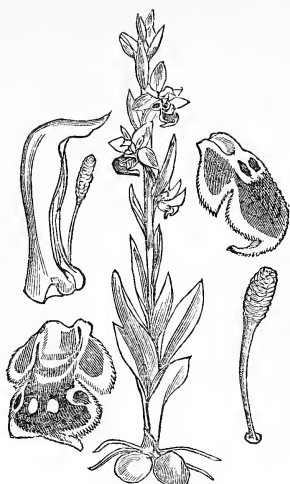


Fig. 999.

2. Spider Ophrys. *Ophrys aranifera*, Huds. (Fig. 1000.)

(Eng. Bot. t. 65, *O. fucifera*, Suppl. t. 2649.)

Much like the *bee O.*, but the sepals are green with less of pink, the petals very short, the beak of the column is straight, and the lip is broader, of a dull brown, variously marked with paler spots in the centre, convex as in the *bee O.*, but the edges obscurely or very shortly lobed, and either not turned under, or but very slightly so.

In dry pastures, with nearly the same range as the *bee O.*, rather more common in southern Europe, less so northwards. Much more rare in England than the *bee O.*, and unknown in Ireland. *Fl.* spring and early summer.



Fig. 1000.

3. Fly Ophrys. *Ophrys muscifera*, Huds. (Fig. 1001.)

(Eng. Bot. t. 64.)



Fig. 1001.

A much more slender plant than the two preceding species, with narrow leaves, and a slender spike of 3 or 4 flowers. Sepals oblong or narrow-ovate, greenish. Petals very narrow-linear. Column short, without any beak. Lip much longer than the sepals, oblong, convex, of a purplish-brown, with pale-blue or white marks in the centre; the 2 lateral lobes turned down, the central one larger, with a deep notch.

On dry pastures, in central Europe, extending further east than the last two species, but not near so common in the south. In Britain, spread over a great part of England, and abundant in some of the eastern and south-eastern counties, and has been found in Ireland, in a few localities in Leinster (J. Carroll), but not in Scotland. *Fl. spring and early summer.*

XVI. **CYPRIPEDÆ.** CYPRIPEDIUM.

Rootstock fibrous. Leaves large. Flowers few, with a large inflated lip. Column terminating in a dilated, incurved, thickish, petal-like lobe, below which are 2 distinct anthers, one on each side.

A considerable and very distinct North American and Asiatic genus, with one species extending into western Europe.

1. Slipper Cyripede. *Cypripedium Calceolus*, Linn.

(Fig. 1002.)

(Eng. Bot. t. 1. *Lady's-slipper.*)

Stem $1\frac{1}{2}$ feet high, with large, ovate, pointed leaves, the upper ones lanceolate, and 1 or rarely 2 large showy flowers on long peduncles. Upper sepal opposite the lip, broadly lanceolate, $1\frac{1}{2}$ inches long, a similar one (formed of the 2 lateral ones combined into one) under the lip;

the 2 petals nearly as long, linear and spreading; all of a brown-purple. Lip very large and inflated, compared to a slipper, yellow variegated with purple. Column very much shorter than the petals.

In woods, in Russian Asia and eastern Europe, almost to the Arctic Circle, more sparingly distributed over western Europe. In Britain, almost extinct, although still found occasionally near Settle, in Yorkshire. *Fl.* early summer.



Fig. 1002.

LXXXI. THE IRIS FAMILY. IRIDEÆ.

Perennial herbs, with a bulbous, tuberous, or shortly creeping rootstock, and leaves usually either radical or *equitant*, that is, arranged on opposite sides of the stem, and vertically, not horizontally flattened, opening towards the base in a sheath which embraces the stem. Perianth superior, with 6 petal-like segments. Stamens 3. Ovary inferior, 3-celled, with many ovules. Style 1, with 3 stigmas (or stigmatic lobes), sometimes dilated and petal-like or fringed.

A rather large family, widely spread over the globe, but particularly abundant in southern Africa and other dry sunny climates. It differs from the *Amaryllis* family in the number of stamens, and, in most cases, in the position of the leaves.

Leaves on the stem, *equitant*.

Perianth with 3 outer large segments, and 3 inner small ones. Stigmas large and petal-like, arching over the stamens 1. IRIS.

Perianth with 6 nearly similar segments, but oblique, and arranged almost in two lips 2. GLADIOLUS.

Leaves radical, narrow-linear. Perianth-segments nearly equal, and regular.

Rootstock tufted or fibrous. Flowers 2 or more in a terminal cluster or umbel. Stigmas entire 3. SISYRINCHIUM.

Rootstock bulbous. Scapes 1-flowered.

Perianth-tube very short. Stigmas deeply 2-cleft . . . 4. *TRICHONEMA*.

Perianth-tube longer than the segments. Stigmas
jagged or much divided 5. *CROCUS*.

The *Ixias*, *Tigridias*, and many others of the smaller South African bulbs, formerly much more cultivated than they now are, belong to the *Iris* family.

I. **IRIS.** IRIS.

Rootstock thick and horizontal, or rarely bulbous. Leaves equitant. Flowers large and showy; the 3 outer perianth-segments large, spreading or reflexed; the 3 inner ones much smaller, and erect. Stigmas 3, enlarged, each with a petal-like appendage, which arches over the corresponding stamen and outer segment of the perianth.

A considerable genus, widely spread over the northern hemisphere.

Flowers bright yellow. Inner perianth-segments scarcely as long

as the claw of the outer ones 1. *Yellow I.*

Flowers violet-blue or yellowish-white. Inner segments two-

thirds as long as the outer ones 2. *Fetid I.*

Several continental European species are frequent in our flower-gardens, and occasionally escape into neighbouring waste places, especially the large-flowered *I. susiana* and *I. germanica*, the dwarf *I. pumila*, the bulbous-rooted *I. Xiphium* and *I. xiphioides*, the *I. tuberosa*, etc.

1. **Yellow Iris.** *Iris Pseudacorus*, Linn. (Fig. 1003.)

(Eng. Bot. t. 578. *Yellow Flag*.)

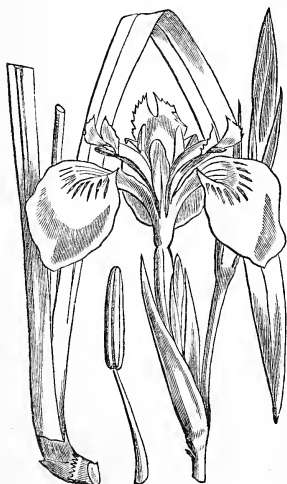


Fig. 1003.

Rootstock thick, horizontal, with numerous fibres. Stem about 2 feet high. Lower leaves often much longer and 1 or 2 inches broad, stiff and erect, of a pale glaucous-green; the upper ones much shorter. Flowers 2 or 3, each proceeding from a sheathing bract, large, erect, of a bright yellow. Outer perianth-segments spreading, broadly ovate, fully 2 inches long, contracted at the base into an erect, broad claw; inner segments oblong and erect, scarcely longer than the claws of the others. Petal-like stigmas rather longer than the inner segments, 2-cleft at the top, with a short, scale-like appendage inside at the base of the lobes. Capsule green, 2 to 3 inches long, with numerous pale-brown seeds.

In wet meadows, and marshes, and along watercourses throughout Europe and Russian Asia, except the extreme north. Abundant in Britain. *Fl. summer.*

2. Fetid Iris. *Iris foetidissima*, Linn. (Fig. 1004.)

(Eng. Bot. t. 596. *Gladdon. Roastbeef-plant.*)

Not so large a plant as the *yellow I.*, the leaves narrower, one or two only overtopping the stem, and the whole plant of a deeper green, smelling disagreeably when bruised. Flowers rather smaller, several together, of a violet-blue or rarely pale yellowish-white. Outer perianth-segments narrow-ovate, the inner ones reaching to about two-thirds their length. Petal-like stigmas scarcely so long. Seeds bright orange or scarlet.

In woods and shady places, in southern Europe, extending eastward to the Caucasus, and northward all over western France, but scarcely into eastern France or Germany. Abundant in many parts of southern England and Ireland, scarce or local in the north, and only a doubtful native of Scotland. *Fl. summer, commencing early.*



Fig. 1004.

II. GLADIOLUS. GLADIOLUS.

Rootstock bulbous, the outer coating fibrous and more or less netted. Stems leafy, with a terminal, one-sided spike of flowers. Perianth oblique, the segments obovate or oblong, narrowed into a claw, and united in a tube at the base, the 3 upper ones and the 3 lower ones almost arranged in 2 lips. Stamens ascending under the uppermost segments. Stigmas 2, slightly expanded, and entire.

A numerous genus, chiefly South African, with a few species in the Mediterranean and Caucasian regions.

1. Common Gladiolus. *Gladiolus communis*, Linn.

(Fig. 1005.)

Stem $1\frac{1}{2}$ to near 2 feet high. Leaves linear-lanceolate, shorter than



Fig. 1005.

the stem. Spike of 4 to 6 or 8 red flowers, all turned to one side, and sessile between 2 lanceolate bracts. Perianth about $1\frac{1}{2}$ inches long, the expanded part of the segments oblong-lanceolate, the uppermost broader and rather longer than the others. Anthers linear, shorter than their filaments. Capsule short, depressed at the top, with 3 prominent angles.

In meadows, woods, and grassy heaths, in central and southern Europe, not reaching nearer us on the Continent than the Loire and the Rhine. In Britain, recently observed in the New Forest, near Lyndhurst, among the Brakes, and believed to be indigenous, but possibly accidentally introduced. *Fl. early summer.* The true *Cornflag* (*G. segetum*),

a cornfield weed, is a rather more southern species, differing chiefly in its larger flowers, with the anthers longer than their filaments.

III. **SISYRINCHIUM.** SISYRINCHIUM.

Rootstock tufted or fibrous. Leaves grass-like or lanceolate, entirely or mostly radical. Flowers delicate, blue. Perianth-segments 6, all nearly equal, similar and spreading, the tube short and broad. Stamens united in a tube. Stigmas 3, filiform, undivided, rolled inwards.

A considerable genus, almost exclusively American.

1. **Bermuda Sisyrinchium.** *Sisyrinchium Bermudiana*, Linn. (Fig. 1006.)

(*S. anceps*, Bab. Man.)

Leaves narrow, grass-like, sheathing at the base, shorter than the stem. Stem 6 inches to 1 foot high, 2-edged, or with 2 narrow acute wings rather broader under the bracts. Flowers 2 to 6 together (usually 3 or 4) in a terminal cluster, the filiform pedicels almost concealed within 2 sheathing bracts, of which the outer one often ends in a leafy tip exceeding the flowers, but occasionally both are nearly equal. Fruit a small globular capsule.

In moist meadows, woods, and grassy places, very common throughout North America. In Britain only near Woodford, county Galway in Ireland, where there seems no ground to suppose that it can have been introduced by human agency. *Fl. summer*. The species is commonly divided into two varieties, *S. anceps*, Cav., with broad stem-wings and the outer bract longer than the flowers, and *S. mucronatum*, Mich., with narrow stem-wings and the outer bract shorter than the flowers. The Irish specimens are commonly referred to the former, but they are in fact very much nearer to the latter.

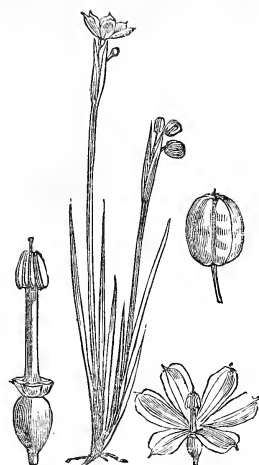


Fig. 1006.

IV. **TRICHONEMA.** TRICHONEMA.

Small bulbous plants, with the foliage and flowers of *Crocus*, except that the perianth-tube is very short, and the short stigmas are deeply 2-cleft.

A genus of very few species, chiefly from the Mediterranean region.

1. **Common Trichonema.** *Trichonema Bulbocodium*, Sm. (Fig. 1007.)

(*Ixia*, Eng. Bot. t. 2549.)

Bulb small, with shining brown coats. Leaves very narrow and grass-like, spreading, 3 or 4 inches long, sheathing at the base. Flower-stalk not half so long, with a single erect terminal flower, almost sessile in a sheathing bract, and of a pale purplish-blue, with a yellow centre. Perianth near $\frac{3}{4}$ inch long, the segments half-spreading and rather pointed.

In heaths and sandy places, chiefly near the sea, nearly all round the Mediterranean, and up the western coasts of Europe, to the Channel Islands and Devonshire, where it is found in abundance at the Warren, near Dawlish. *Fl. spring*.



Fig. 1007.

V. **CROCUS.** CROCUS.

Rootstock bulbous, the outer coating fibrous, and more or less netted, or rarely remaining membranous. Leaves radical, narrow-linear. Flowers almost sessile among the leaves, with a very long tube, and a campanulate limb of 6 nearly equal segments. Stigmas dilated and coloured at the top, and often cut or fringed, but not petal-like. Capsule buried among the leaves.

A small south European and west Asiatic genus, a few species extending into central Europe, and several, long since cultivated for ornament, or for saffron collected from their stigmas, have established themselves in a few localities still further north.

Flowers in spring, with the leaves. Stigmas wedge-shaped, and

slightly jagged 1. *Spring C.*

Flowers in autumn, without leaves. Stigmas cut into a many-

lobed fringe 2. *Naked C.*

1. **Spring Crocus.** *Crocus vernus*, Willd. (Fig. 1008.)

(Eng. Bot. t. 344.)



Fig. 1008.

Leaves enclosed at the base in a tube of 2 or 3 thin, scarious, sheathing scales. Flowers solitary within the leaves, of a bluish-purple; the ovary sessile on the bulb, the long tube enclosed at the base in a sheath similar to that of the leaves. Stigmas of a rich-orange, dilated at the top, and slightly jagged, but not deeply fringed.

In meadows, in the hilly districts of central and southern Europe, not further north than central France. In Britain, apparently naturalized in the meadows about Nottingham, and other parts of central England, and in some parts of Ireland. *Fl. early spring.*

2. **Naked Crocus.** *Crocus nudiflorus*, Sm. (Fig. 1009.)

(Eng. Bot. t. 491.)

Flowers rather larger than in the *spring C.*, appearing after the leaves of the year have withered, and before those of the following year

are developed. They somewhat resemble the flowers of the *common Colchicum*, but are readily distinguished by the 3, not 6, stamens. Tube very long, enclosed halfway up in the sheathing scales. Stigmas deeply cut into an elegant orange fringe or tassel.

In meadows and pastures, in south-western Europe, but not nearer to us than south-western France. Said, however, to be perfectly naturalized in the meadows about Nottingham, and in some other localities in central England. *Fl. autumn.*



Fig. 1009.

LXXXII. AMARYLLIS FAMILY. AMARYLLIDÆÆ.

Rootstock bulbous, except in a very few exotic genera. Leaves radical and parallel-veined. Perianth petal-like, with 6 segments. Stamens 6, the anthers turned inwards. Ovary inferior or adherent to the perianth-tube, 3-celled. Fruit a capsule, with several seeds, opening in 3 valves.

A large Order, widely distributed over the globe, chiefly in dry, sunny countries; differing from the *Lily* family in the inferior ovary, from the *Iris* family in the 6 stamens.

Perianth tubular at the base, the limb spreading, with a cup-shaped or tubular crown at the mouth of the tube 1. NARCISSUS.
Perianth divided to the ovary, without any crown.

Three outer perianth-segments larger than the inner ones 2. SNOWDROP.

Perianth-segments all equal 3. SNOWFLAKE.

Many of the most showy exotic bulbous plants grown in our gardens and planthouses belong to this family, including the genera *Amaryllis* (one species called *Guernsey Lily*, from having been accidentally established in the gardens of that island in a half wild state), *Alstr meria*, *Crinum*, *Pancratium*, and others, besides the gigantic *Agave americana*, commonly called *Aloe*, but not a congener to the true *Aloes* of botanists, which are *Liliaceous* plants.

I. **NARCISSUS.** NARCISSUS.

Flowers either solitary or several together, from a terminal spatha. Perianth with a distinct tube above the ovary, and 6 usually spreading segments, with a cup-shaped or tubular, white or coloured crown at their base, round the orifice of the tube.

A well-defined and very natural genus, chiefly south European, not extending into Asia beyond the Caucasus, and probably containing but few real species, although some botanists, availing themselves of the most trifling characters, observed chiefly in cultivated varieties, have proposed the breaking it up into 15 or more genera, with above a hundred supposed species.

Flowers solitary, the crown broadly tubular, as long as

the segments 1. *Daffodil N.*

Flowers usually 2, the crown very short and concave . 2. *Two-flowered N.*

Several other cultivated species have occasionally established themselves for a time in the vicinity of gardens, particularly the *poet's N.* (*N. poeticus*, Eng. Bot. t. 275), from the Mediterranean region, which is near the *two-flowered N.*, but has usually a solitary flower, of a pure white, except the crown, which is yellow, often edged with orange or crimson.

1. **Daffodil Narcissus.** *Narcissus Pseudonarcissus*, Linn.
(Fig. 1010.)

(Eng. Bot. t. 17. *Daffodil. Daffy-down-dilly.*)



Fig. 1010.

Bulb rather large. Leaves usually 2 or 3, seldom a foot long, from 4 to 6 lines broad, of a bluish-green. Stem rather taller, with a single large, scentless, yellow flower. Perianth-tube about an inch long, wider at the top; the segments ovate or oblong, of the length of the tube; the crown very conspicuous, broadly tubular, often longer than the segments, and slightly 6-lobed, or waved at the edge.

In meadows and mountain-pastures, dispersed over the greater part of temperate Europe, especially France and Spain. Abundant in many parts of England, but in several instances only as an escape from cultivation, as it soon establishes itself in great quantities in a meadow where it was once introduced;

in Scotland and Ireland only where introduced. *Fl. early spring.* It varies much in the size and intensity of colour of the flower, and the relative size of the crown.

2. Two-flowered Narcissus. *Narcissus biflorus*, Curt.

(Fig. 1011.)

(Eng. Bot. t. 276. *Primrose Peerless.*)

Much resembles the *Daffodil* in stature and foliage, except that it is rather stouter and taller. Flowers usually two together, of a pale straw-colour, or nearly white, and sweet-scented. Perianth-tube slender, about an inch long; the segments rather shorter, oval or oblong; the crown very short, concave or broadly cup-shaped, yellow, slightly crenate at the edge.

In meadows, in southern and western Europe, chiefly Spain and western France, the more eastern Mediterranean plant so called being probably a variety of the *poet's N.* In Britain, much cultivated in cottage gardens, and frequently established in their vicinity, but probably truly indigenous in Ireland, and some parts of western and southern England. *Fl. spring.*

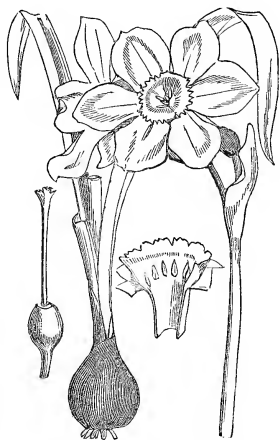


Fig. 1011.

II. SNOWDROP. GALANTHUS.

A single species, distinguished as a genus from *Snowflake* by the inner perianth-segments being shorter than the outer ones, and by the finely-pointed anthers opening at the top only.

1. Common Snowdrop. *Galanthus nivalis*, Linn. (Fig. 1012.)

(Eng. Bot. t. 19.)

Bulb rather small. Leaves 2 or rarely 3, narrow-linear, short at the time of flowering, but lengthening considerably afterwards. Stem 6 inches to near a foot high, with a single drooping, sweet-scented flower,

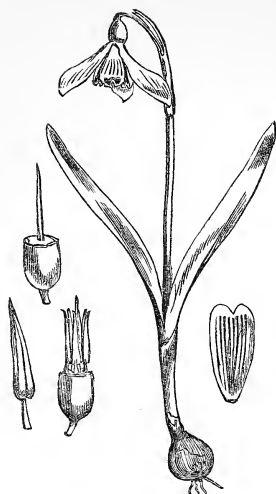


Fig. 1012.

shortly pedicellate above the terminal bract or spatha. Perianth-segments quite distinct down to the ovary, the 3 outer ones pure white, oblong, about 8 or 9 lines long, the 3 inner about half that length, and usually tipped with green.

In woods and shady pastures, in central and southern Europe, extending eastward to the Caucasus and northward into central Germany. In Britain, probably not indigenous, but long cultivated in cottage gardens, and now perfectly naturalized in many parts of England, and here and there in Ireland and Scotland. *Fl. early spring.*

III. SNOWFLAKE. *LEUCOIUM.*

Flowers solitary or several together, from a terminal spatha. Perianth-segments 6, nearly equal, distinct down to the ovary or slightly cohering at the base. Anthers obtuse, opening in longitudinal slits.

A genus of very few species, chiefly south European, and distributed by some garden botanists into almost as many genera.

1. Summer Snowflake. *Leucoium æstivum*, Linn.

(Fig. 1013.)

(Eng. Bot. t. 621.)

Bulb larger than that of the *Snowdrop*. Leaves few, a foot long or more, like those of a *Narcissus*. Stem 1 to 1½ feet high, with a terminal cluster of 2 to 6 broadly bell-shaped flowers, on pedicels varying from 1 to 2 inches in length, arising from a sheathing bract or spatha. Perianth-segments ovate, about 6 lines long, of a pure white, with a short, sometimes greenish tip.

In meadows, in central and southern Europe, extending eastward to the Caucasus, and northward rather further than the *Snowdrop*. Occurs in several of the south-eastern counties of England, with more probability of being really indigenous than in the case of the *Snowdrop*, and less frequently cultivated. *Fl. spring, rather late.*

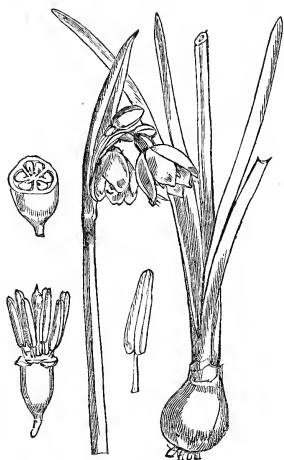


Fig. 1013.

LXXXIII. THE YAM FAMILY. DIOSCORIDÆ.

Climbing plants, with tuberous or woody rootstocks, alternate leaves with netted veins between the ribs, and small, unisexual flowers. Perianth of 6 divisions. Stamens in the males 6. Ovary in the females inferior, 3-celled, with 1 to 3 ovules in each cell. Styles or stigmas 3. Seeds with a minute embryo in a hard albumen.

An Order consisting of but very few genera, but with a considerable number of species, dispersed over the warmer regions of the globe. They include the cultivated *Yams*, and several South African and Mexican plants introduced into our greenhouses as curiosities on account of their massive woody rootstocks, contrasted with the slender, climbing, annual stems.

I. TAMUS. TAMUS.

A single or perhaps two species, distinguished as a genus in the Order by the fruit, which is a berry, not a dry capsule.

1. Common Tamus. *Tamus communis*, Linn. (Fig. 1014.)

(Eng. Bot. t. 91. *Black Bryony*.)

An elegant climber, twining to a considerable length over hedges



Fig. 1014.

and bushes, easily known by its bright, shining, heart-shaped leaves, with a tapering point, and sometimes almost 3-lobed but otherwise entire. Flowers small, of a yellowish-green; the males in slender racemes, often branched and longer than the leaves; the females in much shorter and closer racemes. Berries scarlet, often very numerous.

In hedges, open woods, and bushy places, in west central and southern Europe, extending eastward to the Caucasus, and northward only into southern and western Germany. Dispersed over nearly the whole of England, and common in some counties, but not found in Scotland or Ireland. *Fl. spring and early summer.*

LXXXIV. THE LILY FAMILY. LILIACEÆ.

Perennial herbs, with a creeping, bulbous, or clustered root-stock, and either radical leaves and peduncles, or annual, biennial, or, in a few exotic species, perennial, leafy flowering-stems. Flowers hermaphrodite or rarely unisexual. Perianth inferior, petal-like, with 6 divisions. Stamens 6. Ovary free, 3-celled, with several ovules or rarely only one ovule in each cell. Style single, with an entire or 3-parted stigma. Fruit a capsule or berry. In a very few cases the parts of the flower are reduced to 4, or increased to 8.

A large Order, widely distributed over every part of the globe, and supplying several of the most gorgeous ornaments of our flower-gardens. It is easily distinguished from the *Alisma* family by the carpels united into a single ovary and fruit, from the *Amaryllis* family by the free or superior ovary, from the *Rush* family by the petal-like, coloured perianth. It is usually divided into two or more Orders, variously circumscribed according as the character is taken from the foliage, the fruit, the seed, or the stock, none of which taken alone give a very natural demarcation. A more natural arrangement appears to be to

preserve the whole as one large family, divided into several suborders, of which the five enumerated below are represented in Britain.

Stem leafy.

Stem branching. Fruit a berry.

Leaves short, subulate, and clustered. Flowers

axillary 5. ASPARAGUS.

Leaves ovate, stiff, and prickly. Flowers on the

back of the leaves 6. RUSCUS.

Stem simple.

Fruit a berry.

Leaves net-veined, in a single whorl of 4 or

rarely 5 1. PARIS.

Leaves parallel-veined, alternate or radical.

Flowers axillary 2. SOLOMON-SEAL.

Flowers in a terminal raceme.

Perianth bell-shaped. Leaves radical . . 3. CONVALLARIA.

Perianth spreading, divided to the base.

Leaves alternate 4. SMILACINA.

Fruit a capsule.

Rootstock not bulbous.

Flowers of a brownish-white, paniculate . 15. SIMETHIS.

Flowers yellow, in a raceme or spike.

Style simple 16. NARTHECIUM.

Styles 3. Stigmas capitate 17. TOFIELDIA.

Stigmas 3, sessile, feathery TRIGLOCHIN (p. 799).

Rootstock bulbous.

Flowers in a terminal umbel or head . . . 18. ALLIUM.

Flowers solitary, or in a terminal raceme.

Perianth-segments spreading.

Perianth white, with pink stripes.

Flowers usually solitary 9. LLOYDIA.

Perianth yellow. Flowers in a corymb-

like raceme 10. GAGEA.

Perianth-segments converging into a bell-

shape.

Segments chequered, the inner ones

with a cavity near the base . . . 7. FRITILLARY.

Segments not chequered, without any

cavities 8. TULIP.

Stem leafless. Leaves all radical, sometimes sheathing the stem.

Rootstock creeping. Fruit a berry 3. CONVALLARIA.

Rootstock bulbous. Fruit a capsule.

Flowers radical, with a very long tube com-

mencing underground 18. COLCHICUM.

Flowers in a terminal umbel or head . . . 14. ALLIUM.

Flowers in a terminal raceme.

Perianth of one piece, with 6 minute teeth . 13. MUSCARI.

Perianth of 6 segments.

Flowers blue or pink. (Filaments flattened or not) 12. SQUILL.

Flowers white or greenish. Filaments flattened 11. ORNITHOGALUM.

Flowers yellow. Filaments not flattened 10. GAGEA.

The above Genera belong to the following Suborders:—

1. TRILLIDÆ. Fruit a berry. Leaves with netted veins. Styles free. *Genus*:—1. PARIS.

2. CONVALLARIÆ. Fruit a berry. Leaves with parallel veins. Styles united. Testa of the seed membranous. *Genera*:—2. SOLOMON-SEAL; 3. CONVALLARIA; 4. SMILACINA.

3. ASPARAGÆ. Fruit a berry. Leaves with parallel veins. Styles united. Testa of the seed hard and black. *Genera*:—5. ASPARAGUS; 6. RUSCUS.

4. LILIÆ. Fruit a capsule. Styles united. *Genera*:—7. FRITILLARY. 8. TULIP; 9. LLOYDIA; 10. GAGEA; 11. ORNITHOGALUM; 12. SQUILL; 13. MUSCARI; 14. ALLIUM; 15. SIMETHIS; 16. NARTECTUM.

5. COLCHICÆ. Fruit a capsule. Styles distinct. *Genera*:—17. TOFIELDIA; 18. COLCHICUM.

Among the exotic Genera most familiar by long or general cultivation may be mentioned the *Hyacinth*, *Asphodel*, *Yucca*, *Lily*, *Calochortus*, *Erythronium*, *Hemerocallis*, *Tuberose* (*Polyanthus*), *Agapanthus*, *Funckia*, etc., and some of their species, especially of *Lily*, occasionally appear almost wild in the neighbourhood of gardens. The *Pineapple* and some showy *Pourretias* and *Tillandsias*, occasionally seen in our hothouses, belong to the nearly allied family of *Bromeliaceæ*.

I. PARIS. PARIS.

Rootstock creeping. Stem simple, with a single whorl of netted-veined leaves, and a single terminal flower. Perianth of 8 or rarely 10 narrow segments. Stamens as many. Ovary with 4 or rarely 5 cells, and as many distinct styles or stigmas.

A genus containing, besides the European species, only two or three Asiatic ones.

1. Common Paris. *Paris quadrifolia*, Linn. (Fig. 1015.)

(Eng. Bot. t. 7. *Herb-Paris*.)

Stem 9 inches to a foot high, with a whorl of 4 broadly-ovate or obovate leaves, 2 to 3 or 4 inches long. Peduncle rising to 1 or 2 inches above the leaves. Perianth of a yellowish-green colour; the 4 outer segments narrow-lanceolate, about an inch long; the 4 inner ones linear and rather more yellow. Anthers linear, on slender filaments.

Berry of a bluish-black colour. Sometimes, but rarely, there is a fifth leaf, with the addition of a fifth to each of the parts of the flower.

In woods and shady places, dispersed over Europe and Russian Asia, from the Mediterranean to the Arctic Circle, but not generally very common. Scattered over several parts of Britain, but usually very local. *Fl.* spring or early summer.

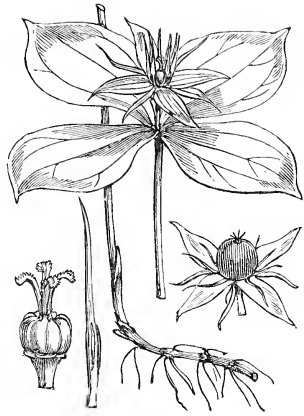


Fig. 1015.

II. SOLOMON-SEAL. POLYGONATUM.

Stems annual, erect and leafy, with a thick horizontal rootstock. Leaves parallel-veined. Flowers axillary, drooping. Perianth tubular, shortly 6-cleft. Stamens 6, inserted in the perianth. Ovary 3-celled, with 2 ovules in each cell. Styles slender, with an entire stigma. Fruit a small berry.

A small genus, spread over the northern hemisphere without the tropics, easily known by its foliage and inflorescence.

Leaves whorled, narrow 1. *Whorled S.*
Leaves alternate.

Flowers usually several in each axil. Filaments hairy . . . 2. *Common S.*

Flowers 1 or rarely 2 in each axil. Filaments glabrous . . . 3. *Angular S.*

1. Whorled Solomon-seal. *Polygonatum verticillatum*, All. (Fig. 1016.)

(*Convallaria*, Eng. Bot. t. 128.)

Stem about 2 feet high. Leaves numerous, in whorls of 3, 4, or 5, narrow-lanceolate, 2 to 3 inches long, of a bright green. Flowers usually several in each axil, on short branching peduncles or rarely solitary. Perianth about 4 lines long, white, with greenish tips. Berries

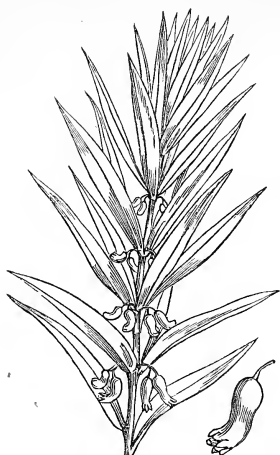


Fig. 1016.

of a dark, nearly black blue, or red according to Koch.

In woods and shady places, in the mountain districts of Europe and central Asia, extending far into Scandinavia. Very rare in Britain, being only known from near Bellingham, in Northumberland, and near Dunkeld, in Perthshire. *Fl. June.*

2. Common Solomon-seal. *Polygonatum multiflorum*, All. (Fig. 1017.)

(*Convallaria*, Eng. Bot. t. 279.)

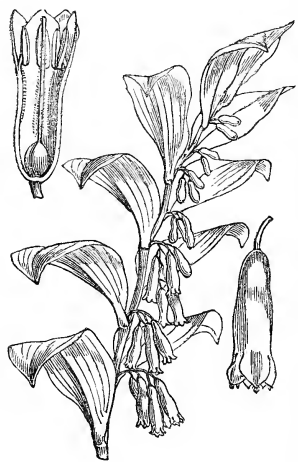


Fig. 1017.

Stems near 2 feet high, erect or rather inclining to one side. Leaves alternate, ovate or oblong, 3 or 4 inches long, all usually turning to one side. Flowers 2 to 7 or 8 together, on short branching peduncles, usually turned to the lower side of the stem away from the leaves. Perianth 7 or 8 lines long, white, with greenish tips. Filaments and style hairy, all included within the perianth. Berries of a dark blue, or red according to Godron.

In woods and shady places, almost all over Europe and Russian Asia, except the extreme north. Occurs in several parts of England and southern Scotland, but not always truly indigenous, and not recorded from Ireland. *Fl. spring or early summer.*

3. Angular Solomon-seal. *Polygonatum officinale*, All.
(Fig. 1018.)

(*Convallaria Polygonatum*, Eng. Bot. t. 280.)

Very near the *common S.*, but of smaller stature, seldom exceeding a foot in height; the flowers rather larger and especially thicker, solitary or two only in each axil, and the filaments of the stamens quite glabrous.

With nearly the same geographical range as the *common S.*, but generally in more open and rocky situations, and more common in the limestone districts of southern Europe. In Britain, more scarce, but undoubtedly wild in several localities in England and South Wales. *Fl. spring and early summer.*



Fig. 1018.

III. **CONVALLARIA.** CONVALLARIA.

A single species, separated from *Solomon-seal* by the leafless flower-stem bearing a terminal raceme, and by the short bell-shaped perianth, with the stamens inserted near its base.

1. Sweet Convallaria. *Convallaria majalis*, Linn.
(Fig. 1019.)

(Eng. Bot. t. 1035. *Lily-of-the-Valley*.)

Rootstock creeping. Leaves radical, usually 2 together in a scaly sheath; their long footstalks enclosed one within the other so as to appear like a stem; the blade oblong, tapering at both ends, 4 to 6 inches long. Peduncle leafless, radical, shorter than the leaves. Flowers drooping, bell-shaped, of a pure white, and very sweet-scented, in a loose raceme. Berries globular, red.

In woods, dispersed over Europe and Russian Asia, from the Me-



Fig. 1019.

diterranean to the Arctic Circle, and very common in some localities, especially towards the centre and north, but totally wanting in other districts. Abundant in some counties of England, very local or wanting in others, and scarcely indigenous in Scotland or Ireland. *Fl. spring.*

IV. **SMILACINA.** SMILACINA.

Rootstock usually creeping, with annual erect stems. Leaves alternate. Flowers small, in a terminal simple raceme or narrow panicle. Perianth deeply divided into 4 or 6 nearly equal spreading segments. Stamens 4 or 6, inserted at the base of the perianth-segments. Ovary 2- or 3-celled, with 2 ovules in each cell. Style short, with a 2- or 3-lobed stigma. Fruit a small berry.

A small genus dispersed over Europe, temperate Asia, and North America.

1. Two-leaved *Smilacina*_a. *Smilacina bifolia*, Desf.

(Fig. 1020.)

(*Maianthemum*, Brit. Fl. *May-Lily*.)

Rootstock slender, creeping. Stems 6 to 9 inches high. Leaves 2, alternate, shortly stalked, ovate, deeply cordate. Flowers small, white, in a terminal raceme about an inch long, not branched, but the short slender pedicels usually clustered. Perianth of 4 divisions. Stamens 4. Ovary 2-celled. Berries small, red.

In woods and occasionally in pastures, dispersed over Europe, Russian Asia, and North America, and often very common. Rare in Britain, and omitted in the first edition of this Handbook, in the belief that the few localities assigned to it were only where it had been planted. It is however stated to be undoubtedly indigenous and abundant near Hackness, six miles from Scarborough. *Fl. early summer.*



Fig. 1020.

V. ASPARAGUS. ASPARAGUS.

Herbs, with a creeping, matted rootstock, and annual branching stems, with clusters of fine, short, subulate leaves (theoretically described as abortive pedicels), surrounded by short scarious scales (theoretically considered to be leaves or bracts). Flowers small, axillary. Perianth of 6 distinct segments. Stamens 6. Ovary 3-celled, with 2 ovules in each cell. Style single, with a 3-lobed stigma. Fruit a berry.

A considerable genus, chiefly African, with a few south European or Asiatic species, all readily known by the foliage.

1. Common Asparagus. *Asparagus officinalis*, Linn.

(Fig. 1021.)

(Eng. Bot. t. 339.)

Stems erect and much branched, usually 1 to 2 feet high in the wild state, attaining 4 or 5 feet when cultivated, and elegantly feathered by the numerous clusters of fine subulate leaves, about half an inch long. Flowers small, of a greenish-white, hanging on slender pedicels,



Fig. 1021.

2 or 3 together in the axils of the principal branches, many of them with stamens only. Berries small, red, and globular.

In maritime sands, or in sandy plains, in central and western Asia, all round the Mediterranean, and up the western coasts of Europe to the English Channel. In Britain, confined to the western and south-western shores of England, and the coast of Wexford and Waterford in Ireland. *Fl. summer.* The cultivated *Asparagus* of our gardens belongs to the same species.

VI. **RUSCUS.** RUSCUS.

Shrub-like herbs, with a perennial rootstock, hard, green, branching stems, and alternate, stiff, evergreen, parallel-veined leaves (theoretically shown to be short leaf-like branches), with minute, often microscopical scales (the real leaves) underneath them. Flowers small, mostly unisexual, apparently sessile on the middle of the leaf. Perianth of 6 distinct segments. Stamens united in a tube, with 3 or 6 anthers. Ovary 3-celled, with 2 ovules in each cell. Style simple, with an undivided stigma. Fruit a berry.

A small European and North African genus, easily known among European *Monocotyledons* by its stiff, shrub-like habit.

1. **Common Ruscus.** *Ruscus aculeatus*, Linn. (Fig. 1022.)

(Eng. Bot. t. 560. *Butcher's Broom.*)

A rigid, dark green, much-branched plant, 2 to 3 feet high; the stems said to be biennial, although apparently shrubby. Leaves numerous, ovate, all terminating in a prickly point. Flowers small and white, apparently sessile in the middle of what is really the upper surface of the leaf, though it is usually turned downwards by a twist of the leaf at its base; and a close examination will show that the flower is in fact borne on a pedicel arising from the axil of the leaf and closely

adnate to the surface, with a minute bract under the flower. Berries red.

In woods and bushy places, in west central and southern Europe, extending eastward to the Caucasus and northward to Belgium, but not into Germany. Abundant in some of the southern counties of England, but not truly wild in northern England, Scotland, or Ireland. *Fl. spring.*



Fig. 1022.

VII. FRITILLARY. FRITILLARIA.

Bulbous herbs, with a leafy stem, and one or more rather long, drooping flowers in a terminal raceme. Perianth bell-shaped, with distinct segments as in *Tulip*, but the 3 inner segments have near their base a nectariferous cavity. Stamens inserted at the very base of the perianth, the anthers attached a little above their base. Capsule as in *Tulip*.

An elegant genus, chiefly North American and Asiatic, with 2 or 3 species extending into Europe.

1. Common Fritillary. *Fritillaria Meleagris*, Linn.

(Fig. 1023.)

(Eng. Bot. t. 622. *Snake's-head*.)

Stem a foot high or rather more, with 3 or 4 linear or somewhat lanceolate leaves, and a single terminal drooping flower, usually of a dull red, marked inside with more highly coloured, chequered lines and spots; the segments oblong, narrowed at both ends, about $1\frac{1}{2}$ inches long, the cavity of the inner ones oblong or linear.

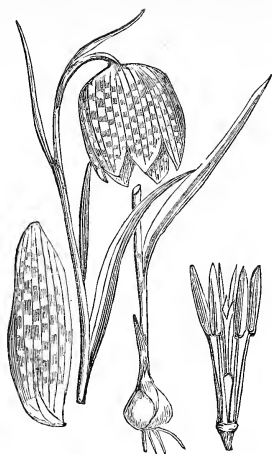


Fig. 1023.

In moist meadows and pastures, and occasionally in woods, all across central Europe, from France and southern Scandinavia to the Caucasus, replaced in southern Europe by a closely allied species or variety. Occurs in several parts of England, but perhaps truly wild only in some of the southern and eastern counties, and not in Scotland or Ireland. *Fl. spring.* It varies occasionally with white or yellowish flowers.

VIII. **TULIP.** TULIPA.

Bulbous herbs, with a leafy stem, and a single terminal flower (or very rarely two), usually large and erect when fully out. Perianth bell-shaped; the segments free from the base, without any depression in the centre. Stamens free from the perianth; the anthers erect, attached by their base. Capsule 3-celled, with several flattish horizontal seeds in each cell, their testa pale and thin.

A splendid genus, chiefly south European and west Asiatic, including the *Tulips* of our gardens, which are most of them varieties of *T. Gesneriana*.

1. Wild Tulip. *Tulipa sylvestris*, Linn. (Fig. 1024.)

(Eng. Bot. t. 63.)

Stem about a foot high, with 1, 2, or rarely 3 linear-lanceolate leaves, and a single terminal yellow flower, drooping in the bud, nearly erect when fully out, and with a faint fragrant smell. Perianth-segments narrowed at the base and at the top, about $1\frac{1}{2}$ inches long, the inner ones rather broader than the outer. Stamens about half as long, with a tuft of hairs at the base of the filaments.

In fields, pastures, and waste places, in central and southern Europe, extending eastward to the Caucasus and northward to southern Scandinavia. Believed to be truly indigenous in some of the eastern counties of England, and occurs, as an introduced plant, in some other localities in England and Scotland. *Fl. spring.*

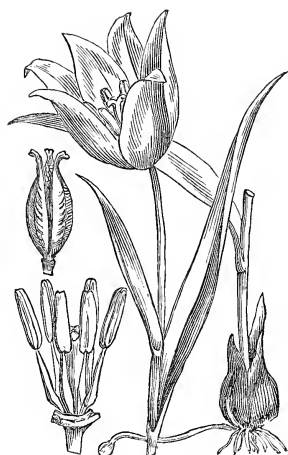


Fig. 1024.

IX. **LLOYDIA.** LLOYDIA.

A single species, with most of the technical characters of a *Tulip*, but with the small spreading perianth of the following genera.

1. **Mountain Lloydia.** *Lloydia serotina*, Reichenb.

(Fig. 1025.)

(*Anthericum*, Eng. Bot. t. 793.)

Bulb small, with 2 or 3 almost filiform leaves, 3 or 4 inches long, and a slender stem, about the same height, bearing 2 or 3 short narrow leaves and a single terminal white flower. Perianth-segments about 4 or 5 lines long, spreading, broadly oblong, marked inside with 3 longitudinal reddish lines, and a small yellow spot at their base. Stamens shorter than the perianth, and inserted at its very base.

In rocky mountains, in northern and Arctic Europe, Asia, and America, and in the high mountain-ranges of Europe, the Caucasus, and Altai. Very rare in Britain, and only in some of the higher mountains in North Wales. *Fl. June.*



Fig. 1025.

X. **GAGEA.** GAGEA.

Bulbous herbs, with 1 or 2 radical leaves, and a short stem, with a terminal raceme of yellow flowers flattened into a corymb, with a leaf-like green bract under each pedicel, and sometimes a leaf below the flowers. Perianth spreading, with distinct segments. Stamens inserted at their very base, with filiform, not flattened filaments. Seeds of *Ornithogalum*.

A small European and Asiatic genus, closely allied to *Ornithogalum*, with which it was formerly united, but distinguished by the stamens, the yellow flowers, and more leafy bracts.

1. Yellow Gagea. *Gagea lutea*, Ker. (Fig. 1026.)

(*Ornithogalum*, Eng. Bot. t. 21.)



Fig. 1026.

Bulbs small, forming usually two new ones every year, one on each side of the old one. Leaves 1 or very rarely 2, linear, pointed and curved like those of a *Tulip*. Stem slender, rarely 6 inches high. Flowers 3 or 4, in a flat raceme, almost contracted into an umbel; the leaf-like bracts as long as the pedicels or longer. Perianth-segments about 6 lines long, very spreading, narrow oblong, yellow, with a green back.

In meadows and fields, especially in sandy soils, over the greater part of Europe and Russian Asia, except the extreme north. Occurs in several parts of England, and the lowlands of Scotland, but rarely, and is not found in Ireland.

Fl. spring. Continental botanists distinguish as species several forms, accord-

ing as to whether there are 1, 2, or 3 bulbs at the time of flowering (if one only, it is the old bulb still remaining entire, the new ones commencing only, or not yet visible; if 3, the 2 new ones are fully formed, spreading out horizontally before the old one is absorbed; if 2, the old one is fully absorbed, leaving only a shrivelled stem between the 2 new ones), and some slight differences in the breadth, and obtuse or pointed ends of the perianth-segments, and it is probable that similar variations may be found in the British specimens.

XI. **ORNITHOGALUM.** ORNITHOGALUM.

Bulbous herbs, with the leaves all radical, and not sheathing the stem. Flowers white or partly green, in a terminal raceme, with a scarious bract under each pedicel. Perianth very spreading, with distinct segments, remaining persistent after fading. Stamens almost free from the perianth, with flattened filaments. Seeds few, black, nearly globular.

A considerable genus, chiefly European, west Asiatic, and African, only distinguished from *Squill* by the more persistent perianth, without any blue or pink in its colour.

Raceme flattened into a corymb, the lower pedicels much

longer than the upper 1. *Common O.*

Raceme elongated, the pedicels of nearly equal length.

Flowers few and large, the segments near an inch long . . 2. *Drooping O.*

Flowers small and numerous, the segments about 4 lines

long 3. *Spiked O.*

1. **Common Ornithogalum.** *Ornithogalum umbellatum*,
Linn. (Fig. 1027.)

(Eng. Bot. t. 130. *Star-of-Bethlehem.*)

Bulbs ovoid, full of a clammy juice, like that of the *Bluebell*. Leaves long and narrow, weak and flaccid. Stem from a few inches to near a foot high. Raceme flattened into a corymb, the lower pedicels being lengthened so as to bring their flowers at least to the level of the inner ones. Perianth-segments very spreading, varying from 6 lines to near an inch in length, white, with a broad, green, central line outside.

In waste and cultivated places, in central and southern Europe, from France and southern Scandinavia, to the Caucasus. In Britain, not truly indigenous, but established as a weed in many parts of England. *Fl. spring and early summer.*

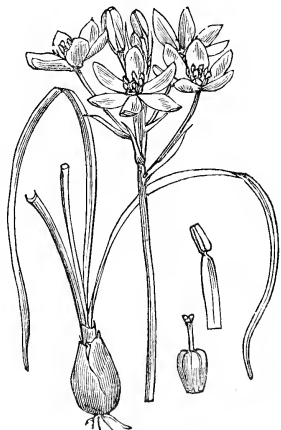


Fig. 1027.

2. Drooping Ornithogalum. *Ornithogalum nutans*, Linn.
(Fig. 1028.)

(Eng. Bot. t. 1997.)



Fig. 1028.

A handsome species, a foot high or more, with a raceme of 5 or 6 large nodding flowers on very short pedicels. Perianth-segments about an inch long, less spreading than in the other species, white within, green in the centre outside. Filaments very broad and petal-like.

In waste and cultivated places, in most parts of central and southern Europe, extending northwards to southern Scandinavia. In Britain, not indigenous, but said to be well established in some parts of England. *Fl. spring.*

3. Spiked Ornithogalum. *Ornithogalum pyrenaicum*,
Linn. (Fig. 1029.)

(Eng. Bot. t. 499.)



Fig. 1029.

Bulb ovoid, with a few long, linear leaves. Stem $1\frac{1}{2}$ to 2 feet high, with a long raceme of small, greenish-white flowers, on slender pedicels varying from 3 to 6 lines in length, with a bract about as long under each one. Perianth-segments very spreading, about 4 lines long. Stamens rather shorter.

In woods and pastures, in western and southern Europe, extending eastward to the Caucasus, and northward into Belgium, but only into southern Germany. Rare in Britain, but has been found in several of the southern counties of England. *Fl. early summer.*

XII. **SQUILL.** SCILLA.

Bulbous herbs, with radical leaves. Flowers usually blue or rarely pink, in a terminal raceme, sometimes flattened into a corymb. Perianth-segments deciduous, free or slightly cohering at the base, either spreading or forming a bell-shaped or tubular flower, and then spreading at the top only. Stamens inserted on the perianth, below the centre of the segments. Seeds of *Ornithogalum*.

A considerable genus, chiefly from the Mediterranean and Caucasian regions, distinguished from *Ornithogalum* chiefly by the colour of the flowers and deciduous perianth, from *Hyacinth* by the segments distinct from the base or very nearly so.

Flowers erect, the perianth-segments spreading.

Flowers in spring, with a bract under each pedicel . . . 1. *Spring S.*

Flowers in autumn, without bracts 2. *Autumn S.*

Flowers nodding, narrow bell-shaped 3. *Bluebell S.*

Two or three Mediterranean species, with corymbose racemes of bright-blue flowers, are frequently cultivated in our flower-gardens.

1. **Spring Squill.** *Scilla verna*, Huds. (Fig. 1030.)

(Eng. Bot. t. 23.)

A delicate little plant, with a small bulb, and narrow-linear leaves, 2 to 4 inches long. Flower-stem seldom 6 inches long, with several small, erect, blue flowers, in a short terminal raceme, almost flattened into a corymb, with a linear bract under each pedicel. Perianth-segments scarcely above 3 lines long, spreading, but not so much so as in *Ornithogalum*. Stamens inserted close to their base.

In stony and sandy wastes, and pastures, especially near the sea, in western Europe, reappearing further east in Denmark, on the Rhine, and in Sardinia. In Britain, it occurs at intervals, but in abundance, on the east coast of Ireland, the western and northern coasts of Great Britain, the east of Scotland, and very locally in north-eastern England. *Fl. spring.*

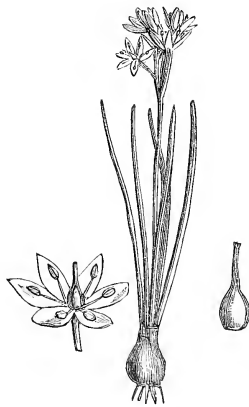


Fig. 1030.

2. Autumn Squill. *Scilla autumnalis*, Linn. (Fig. 1031.)
(Eng. Bot. t. 78.)



Fig. 1031.

Bulb rather larger than in the *spring* *S.* Flower-stems 6 to 9 inches high, or more when very luxuriant, appearing after the leaves have withered away. Flowers small, erect, of a pale violet-blue, or somewhat pink, in a raceme short at first, but which will lengthen out to 2 or even 3 inches, all the pedicels remaining of the same length, and without bracts. As the flowering advances, a tuft of leaves, similar to those of the *spring* *S.*, shoots out by the side of the stem for the following year.

In rocky wastes of southern Europe, from Spain to the Caucasus, extending northward into central France, and up the western coast to the English Channel, reappearing on the Rhine. In Britain, confined to some of the southern counties of England. *Fl. autumn.*

3. Bluebell Squill. *Scilla nutans*, Sm. (Fig. 1032.)
(Eng. Bot. t. 377. *Agaphis*, Brit. Fl. *Endymion*, Bab. Man. *Bluebell*.)

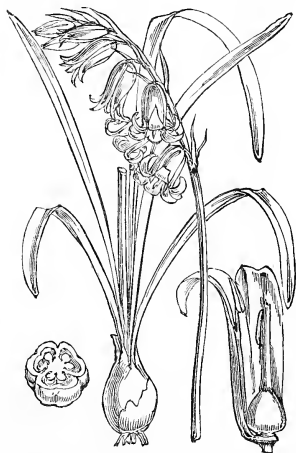


Fig. 1032.

Bulb white, full of a clammy juice. Leaves linear, shorter than the flower-stem, 4 or 5 lines broad. Stem about a foot high, angular, with a terminal, one-sided raceme of drooping blue flowers, each with a small narrow bract at the base of the pedicel. Perianth about 6 lines long, almost tubular, the segments spreading at the top only, although distinct, or very shortly united at the very base. Stamens inserted above the base of the segments, but below the middle.

In woods, hedges, and shady places, in western Europe, from Spain to Britain, extending eastward only into central France, and here and there along the Mediterranean to Italy. Very abun-

dant in Britain. *Fl. spring*. Originally placed in the genus *Hyacinth*, on account of the general form of the perianth; it was removed to *Squill* as having the segments distinct or nearly so, and is now often considered as forming a distinct genus, either alone or with one or more of the intermediate species which connect it with the other *Squills*.

XIII. MUSCARI. MUSCARI.

Bulbous herbs, with radical, linear leaves, and a terminal raceme of nodding flowers, usually blue or brown. Perianth globular or ovoid, contracted at the mouth, with 6 minute teeth.

A small genus, chiefly from the Mediterranean region and western Asia, separated from *Hyacinth* on account of the form of the perianth.

1. Grape Muscari. *Muscari racemosum*, Mill. (Fig. 1033.)

(*Hyacinthus*, Eng. Bot. t. 1931. *Grape Hyacinth*.)

Bulb rather large. Leaves narrow-linear, rather thick, but not stiff, from 6 inches to a foot, or when very luxuriant $1\frac{1}{2}$ feet long. Stem usually shorter, with a close terminal raceme or head of small dark-blue flowers, looking almost like little berries; a few of the uppermost of a paler blue, erect, much narrower, and without stamens or pistil.

In cultivated and waste places, heaths and pastures, in central and southern Europe, extending eastwards to the Caucasus and northwards over a great part of Germany. In Britain, it occurs in several of the southern and eastern counties of England, but believed to be an introduced plant, having been formerly much cultivated in flower-gardens. *Fl. spring*.

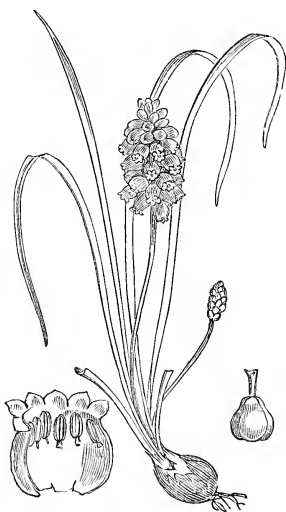


Fig. 1033.

XIV. ALLIUM. ALLIUM.

Bulbous herbs, with radical leaves, sometimes sheathing the stem to a considerable height. Flower-stem otherwise leafless, bearing a

terminal umbel or head of flowers, surrounded by a spatha of 2 or 3 thin, whitish or scarious bracts. Perianth of 6 segments, distinct from the base, either spreading or bell-shaped. Stamens inserted on their base, either all alike or the 3 inner ones broad and 3-cleft; the middle lobe bearing the anther. Capsule with 1 or 2 black seeds in each cell.

An extensive genus, ranging over Europe, Africa, northern Asia, and North America. Most of the species possess the peculiar, well-known onion or garlic smell.

Leaves flat or keeled.

Umbels flat or convex, of few very white flowers.

Leaves quite radical.

Leaves more than an inch broad, on long stalks . . . 7. *Broad A.*

Leaves not $\frac{1}{2}$ inch broad, not stalked . . . 8. *Triquetrous A.*

Umbels nearly globular, with numerous purple or pale flowers (or bulbs). Leaves sheathing the stem at their base.

Leaves very narrow, and thick. Stamens all similar and entire . . . 3. *Field A.*

Leaves flat or keeled. Inner stamens broad and 3-cleft.

Stamens longer than the perianth. Umbels large, rarely with bulbs . . . 1. *Large A.*

Stamens not longer than the perianth. Umbels with bulbs amongst the flowers . . . 2. *Sand A.*

Leaves cylindrical or nearly so, very narrow. Umbels globular.

Stamens all similar and entire.

Flowers on long pedicels, usually intermixed with bulbs. Spatha-bracts with long green points . . . 3. *Field A.*

Flowers in compact heads, without bulbs. Spatha-bracts short . . . 4. *Chive A.*

Three inner stamens flattened, and 3-cleft. Spatha-bracts short.

Flowers intermixed with bulbs . . . 6. *Crow A.*

Flowers without bulbs . . . 5. *Round-headed A.*

The genus comprises also the *Garlic* (*A. sativum*), the *Onion* (*A. Cepa*), the *Shallot* (*A. ascalonicum*), the *Leek* (*A. Porrum*, now believed to be a cultivated variety of the *large A.*), and a few species occasionally cultivated for ornament.

1. Large Allium. Allium Ampeloprasum, Linn. (Fig. 1034.)

(Eng. Bot. t. 1657.)

Stems 2 to 3 feet high. Leaves rather broadly linear, flat, but usually folded lengthwise and keeled underneath, from a few inches to above

a foot long, their sheaths enclosing the lower part of the stem. Flowers very numerous, of a pale purple, on long pedicels, forming large globular heads, with a spatha of 1 or 2 bracts, often tapering into a green point, but shorter than the flowers. Perianth bell-shaped, 2 to 2½ lines long. Stamens protruding from the perianth, the 3 inner ones with flattened, 3-cleft filaments.

In cultivated and waste places, in southern Europe and western Asia. In Britain, indicated as an introduced plant in two or three spots in western England, and said to be more abundant in the Channel Islands, and in an island in Galway Bay, Ireland, but even there probably not indigenous. *Fl. summer*. The *A. Babingtonii*, Eng. Bot. Suppl. t. 2906, is a variety with sessile bulbs in the umbel in lieu of most of the flowers, and our garden *Leek* (*A. Porrum*) is now believed to be a cultivated variety of the same species.

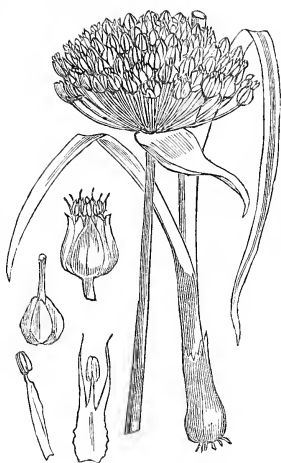


Fig. 1034.

2. Sand Allium. *Allium Scorodoprasum*, Linn. (Fig. 1035.)

(Eng. Bot. Suppl. t. 2905.)

This has the flat leaves, short spatha, bell-shaped perianth, and flat, 3-cleft inner stamens of the *large A.*; but the umbel is usually smaller, seldom (if ever in this country) without bulbs, and the stamens are not longer than the perianth. It is also usually not so stout a plant, the bulb smaller, with the young offsets on slender stalks, and the umbel is occasionally reduced to a head of bulbs without any flowers.

In sandy pastures, and waste places, and occasionally in woods, scattered over northern and central Europe, but not an Arctic plant, and not common in the south. In Britain, chiefly in northern England, southern Scotland, and some parts of Ireland. *Fl. summer*. It may possibly prove to be a bulbiferous variety of the Continental *A. rotundum*.

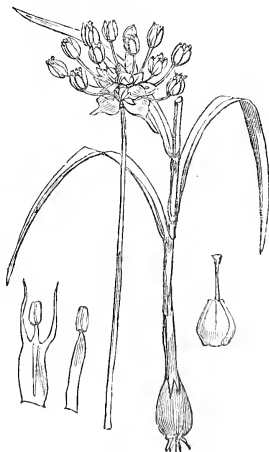


Fig. 1035.

3. Field Allium. *Allium oleraceum*, Linn. (Fig. 1036.)

(Eng. Bot. t. 488, and *A. carinatum*, t. 1658.)



Fig. 1036.

Stems 1 to 2 feet high, with a rather small bulb. Leaves narrow-linear, nearly flat, but rather thick, 1 to $1\frac{1}{2}$ lines broad, their sheathing bases covering the stem a considerable way up. Spatha of 2 broad bracts, with long, green, linear points, one of which at least is much longer than the flowers. Umbel much looser than in the allied species; the flowers pale brown, on pedicels from $\frac{1}{2}$ to above 1 inch long, always (in Britain) intermixed with bulbs. Filaments all simple, rather shorter than the perianth.

In cultivated and waste places, dispersed over all Europe and Russian Asia, except the extreme north. In Britain, chiefly in southern England and Ireland. *Fl. summer*. In southern

Europe it occurs occasionally without bulbs in the umbel. With us the umbel has often bulbs only, and then it is distinguished from the *crow A.* by the long points of the spatha-bracts.

4. Chive Allium. *Allium Schœnoprasum*, Linn.

(Fig. 1037.)

(Eng. Bot. t. 2441. *A. sibiricum*, Suppl. t. 2934. *Chives*.)

Stems about a foot high, often several together. Leaves very narrow, but cylindrical and hollow, only one of them sheathing the stem at its base. Umbel contracted into a dense globular head of rather large, purplish flowers, without bulbs. Spatha of 2, or sometimes 3, broad, coloured bracts, much shorter than the flowers. Perianth-segments 3 to 4 lines long, very pointed. Stamens all alike and simple, considerably shorter than the perianth.

In rocky pastures, throughout temperate and northern Europe and Russian Asia, and in the mountain districts of southern Europe. Rare in Britain, being only recorded with certainty from Northumberland and Cornwall, although indicated in a few other localities in northern England and southern Scotland. *Fl. summer.*



Fig. 1037.

5. Round-headed Allium. *Allium sphaerocephalum*,
Linn. (Fig. 1038.)

(Eng. Bot. Suppl. t. 2813.)

Stems 1 to 2 feet high. Leaves few and short, very narrow, nearly cylindrical, and hollow, their sheathing bases covering the lower half of the stem. Umbel globular, rather dense, with numerous purplish flowers, without bulbs. Spatha of 2 bracts, shorter than the flowers. Perianth about 2 lines long. Stamens usually longer than the perianth, the 3 inner filaments broad and 3-cleft.

In cultivated and waste places, in central and southern Europe, extending eastward to the Caucasus and northward over a great part of Germany and Belgium. In Britain, confined to the neighbourhood of Bristol, and found also in the Channel Islands. *Fl. summer.*



Fig. 1038.

6. Crow Allium. *Allium vineale*, Linn. (Fig. 1039.)

(Eng. Bot. t. 1974.)



Fig. 1039.

Very near the *round-headed A.*, and perhaps only the bulb-bearing form of that species. The stature, foliage, and flowers are the same, except that the perianth is usually much paler and greener, and the inner filaments are said to be rather more deeply cleft. The umbel always bears bulbs intermixed with the flowers, or bulbs only without flowers. In the latter case it is distinguished from the *field A.* most readily by the want of the long points to the spatha leaves.

In cultivated and waste places, over the greater part of Europe, and more common in the north than the *round-headed A.*, extending far into Scandinavia. Frequent in England, Ireland, and southern Scotland. *Fl. early summer.*

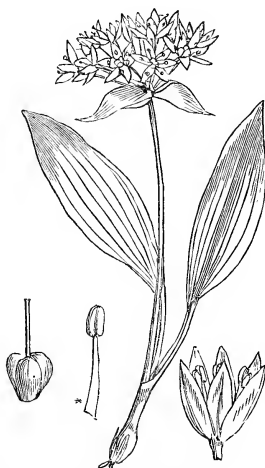
7. Broad Allium. *Allium ursinum*, Linn. (Fig. 1040.)(Eng. Bot. t. 122. *Ramsons.*)

Fig. 1040.

Readily distinguished by the thin, flat, spreading leaves, 6 to 8 inches long and above an inch broad, on long stalks, not sheathing the stem above ground. Flower-stem not a foot high, bearing a loose umbel of about a dozen white flowers; the spatha-bracts usually falling off before the flower expands. Perianth-segments lanceolate, very spreading. Stamens shorter, all simple.

In woods and shady places, in central and southern Europe, extending all across Russian Asia, and northward to southern Scandinavia. Dispersed all over Britain, and in some places very abundant, but not everywhere common. *Fl. spring or early summer.*

8. **Triquetrous Allium.** *Allium triquetrum*, Linn.
(Fig. 1041.)

Leaves broadly linear, flat but folded and keeled, only sheathing the stem at its very base, and sometimes very long. Flower-stem not a foot high, bearing a loose, slightly drooping umbel of rather large white flowers. Spatha-bracts short. Perianth-segments oblong, not spreading. Stamens about half their length, all simple.

In moist, shady places, in the Mediterranean region, from Spain to Greece, unknown in France except the extreme south, but said to be abundant in hedges all over the island of Guernsey. *Fl.* May and June.



Fig. 1041.

XIV. **SIMETHIS.** SIMETHIS.

A single species, differing from all British capsular-fruited *Liliaceæ* except *Narthecium* in its rootstock not bulbous, and from *Narthecium* in its panicked flowers, deciduous perianth, and few seeds. It was formerly comprised in the exotic genus *Anthericum*, but has been isolated on account of a different habit, accompanied by slight differences in the stamens and the number of seeds.

1. **Variegated Simethis.** *Simethis bicolor*, Kunth.
(Fig. 1042.)

(*S. planifolia*, Eng. Bot. Suppl. t. 2952.)

Rootstock short, with a tuft of thick fibrous roots. Leaves all radical, long, linear, and grass-like. Stem leafless, usually under a foot high, branching in the upper part, with a bract under each branch, the lowest bracts often linear and leaf-like. Flowers erect, in a loose terminal panicle. Perianth spreading, of 6 oblong segments, about 4



Fig. 1042.

lines long, white inside, purplish outside, especially near the tip. Stamens shorter than the perianth-segments, inserted near their base, the filaments very woolly. Style entire. Capsule 3-valved, with 2 shining black seeds in each cell.

On heaths and open wastes, in the extreme west of Europe, from north-western Africa to Kerry, in Ireland, and in a single locality in England, near Bourne, in Dorsetshire, possibly introduced with the seeds of the *Pinaster*. *Fl.* early summer.

XV. **NARTHECIUM.** NARTHECIUM.

A single species, with the grass-like vertical leaves, simple racemes, and persistent yellow perianth of *Tofieldia*, but with the bearded filaments and simple style of *Simethis*, differing from both in its minute seeds, with a thread-like point at each end. The consistence of the perianth, firmer than in the generality of *Liliaceæ*, shows an approach to the *Rush* family, with which many botanists associate it.

1. **Bog Narthecium.** *Narthecium ossifragum*, Huds. (Fig. 1043.)

(Eng. Bot. t. 535. *Bog or Lancashire Asphodel.*)

Rootstock shortly creeping. Stem stiff and erect, 6 inches to a foot high or rarely more. Leaves shorter than the stem and near its base, linear, vertically flattened and sheathing at their base in two opposite ranks as in the *Iris* family; the upper ones reduced to short scales. Flowers in a stiff terminal raceme, of a bright yellow. Perianth-segments spreading, lanceolate and pointed, 3 or 4 lines long, green on the back and persistent as in *Ornithogalum*. Stamens rather shorter, their filaments covered with a white wool. Capsule very pointed, longer than the perianth.

In bogs, in western and central Europe, scarcely penetrating within the Russian frontier, and not an Arctic plant, but found also in North America; a rare instance of a species common to Europe and North America without extending over Asia. In Britain, abundant wherever there are bogs and wet moors. *Fl. summer.*



Fig. 1043.

XVI. **TOFIELDIA.** TOFIELDIA.

Herbs, with creeping rootstocks, grass-like, chiefly radical leaves, vertically flattened and sheathing on opposite sides as in the *Iris* family, and small yellow flowers in terminal spikes. Perianth of 6 distinct segments, persistent round the capsule. Stamens inserted at their base. Ovary 3-lobed, with 3 distinct styles. Capsule small, 3-lobed, with several small, oblong, brown seeds.

A small genus, chiefly North American, extending along the Andes to tropical America, and westward across northern Asia to Europe. In its free styles it shows some approach to *Triglochin* in the *Alisma* family.

1. Marsh Tofieldia. *Tofieldia palustris*, Huds. (Fig. 1044.)

(Eng. Bot. t. 536. *Scottish Asphodel.*)

Radical leaves an inch or rarely $1\frac{1}{2}$ inches long. Flower-stem about 6 inches high, with one or two short leaves at its base, and terminated by a little globular or ovoid spike or head; the perianth not quite a line long. The very short pedicels are each in the axil of a minute bract, and within that bract is a still smaller 2-lobed or 3-lobed one, sometimes quite imperceptible, but never placed at the top of



Fig. 1044.

the pedicel as in the larger species which is common in central Europe.

In the bogs of northern Europe, Asia, and America, and of the great mountain-ranges of central Europe, but always at high latitudes or in alpine situations. Not uncommon in the mountains of Scotland and northern England, and said to have been found in northern Ireland. *Fl. summer.*

XVII. **COLCHICUM.** COLCHICUM.

Bulbous herbs, with radical leaves, and the large, almost radical, long-tubed flowers of *Crocus*. Stamens 6. Ovary underground, but within the tube of the perianth, not below it. Styles 3, very long and thread-like. Capsule 3-valved, with many seeds.

A small genus, chiefly Mediterranean and west Asiatic, with the habit of *Crocus*, but very different stamens, ovary, and styles.

1. Common Colchicum. *Colchicum autumnale*, Linn.

(Fig. 1045.)

(Eng. Bot. t. 133. *Meadow-Saffron.*)

At the time of flowering there are no leaves; the brown bulb ending in a sheath of brown scales enclosing the base of the flowers, whose long tube rises to 3 or 4 inches aboveground, with 6 oblong segments of a reddish-purple or rarely white, and near $1\frac{1}{2}$ inches long. Soon afterwards the leaves appear and attain in spring a length of 8 or 10 inches by about 1 or $1\frac{1}{2}$ inches in breadth. The capsule is then raised to the surface of the ground by the lengthening of the

peduncle, soon after which the leaves wither away.

In moist meadows, and pastures, over the greater part of Europe, but rare in the north, and scarcely extends into Asia. Very abundant in some parts of England and Ireland, rare in others, and a very doubtful inhabitant of Scotland. *Fl. autumn.*



Fig. 1045.

LXXXV. THE RUSH FAMILY. JUNCACEÆ.

Herbs, usually stiff, with cylindrical or narrow and grass-like leaves, and small, herbaceous or dry flowers, in terminal or apparently lateral clusters or panicles. Perianth regular, dry, and calyx-like, of 6 segments. Stamens 6 or rarely 3 only, the anthers opening inwards. Styles single, with 3 stigmas. Capsule 1- or 3-celled, opening in 3 valves, with few or many small seeds.

A small family, abundantly spread over the whole surface of the globe, with almost all the technical characters of the *Lily* family except the consistence of the perianth, whilst the general aspect brings it nearer to the *Sedges* and the *Grasses*.

Capsule 3-celled, with many seeds. Leaves cylindrical, at least

at their tips, or very rarely flat 1. RUSH.

Capsule 1-celled, with 3 seeds. Leaves flat and grass-like 2. WOODRUSH.

I. RUSH. JUNCUS.

Leaves stiff and glabrous, cylindrical, at least at the tips, or grooved, or very rarely flat and grass-like. Flowers either distinct or in little clusters, usually arranged in irregular panicles; the branches very unequal in length, with a dry sheathing bract (like the glumes of *Sedges*

and *Grasses*) under each ramification, cluster, or flower; the outer bract or bracts often ending in a long leaf-like point, in some species appearing like a continuation of the stem. Capsule 3-celled, with numerous small seeds.

The principal genus of the Order, and co-extensive in its geographical range. The species are almost all inhabitants of marshy, boggy, or wet ground, and several are almost cosmopolitan.

Stems quite leafless, except the brown sheathing scales at the base, which have no leafy tips. Flowers in a lateral cluster.

Stems soft and pliable.

- Flowers very numerous. Perianth about 1 line long 1. *Common R.*
 Flowers few, about halfway up the stem. Perianth about 2 lines long 3. *Thread R.*

Stems rigid.

- Stems tufted, rather slender. Panicle loose. Perianth-segments very narrow 2. *Hard R.*
 Stems very stiff. Rootstock creeping. Panicle many-flowered. Perianth-segments nearly ovate . . 4. *Baltic R.*

Leaves (sometimes cylindrical and stem-like) either on the stem or under the panicle, or forming leafy tips to the sheathing-scales at the base of the stem.

Leaves cylindrical and hollow, but with internal cross partitions, which make them look jointed when dry.

- Perianth-segments more or less pointed 5. *Jointed R.*
 Perianth-segments all obtuse 6. *Obtuse R.*

Leaves and outer bracts cylindrical, very stiff, with prickly points.

- Capsule much longer than the perianth 12. *Sharp R.*
 Capsule not longer than the perianth 11. *Sea R.*

Leaves neither jointed nor prickly (usually channelled, or slender, or spreading).

Leaves all radical or nearly so (except the outer leaf-like bract), and much shorter than the stem.

- Flowers not clustered, in a loose panicle . . . 8. *Heath R.*
 Flowers in one or two terminal heads.

- Heads solitary, with 2 to 4 flowers 15. *Two-flowered R.*
 Heads 1 or 2, with 6 to 8 flowers in each . . 14. *Chestnut R.*

One or two leaves on the stem below the panicle.

Small annuals. Flowers pale-coloured.

- Flowers distinct, in a much-branched, leafy panicle, occupying the greater part of the plant 9. *Toad R.*

- Flowers collected in one or two terminal heads . 10. *Capitate R.*

Perennials. Flowers brown.

Flowers several, distinct, in a loose panicle.

Outer bract short 7. *Round-fruited R.*

Flowers very few on each stem, distinct. Outer

bracts very long and slender 13. *Highland R.*

Flowers 6 or 8 together in terminal heads . . 14. *Chestnut R.*

These species are well distributed into two sections. In the one, comprising the first ten of the following species, the seeds are ovate or oblong, scarcely pointed. In the second section, to which belong the last five species (11 to 15), the testa of the seed is extended at each end into a little tail-like appendage.

1. Common Rush. *Juncus communis*, Mey. (Fig. 1046.)

(*J. conglomeratus*, Eng. Bot. t. 835, and *J. effusus*, t. 836.)

The shortly creeping matted rootstock bears dense tufts of cylindrical leafless stems, 2 to 3 feet high or even more, erect, but soft and pliable, sheathed at the base by a few brown scales. Some of these stems remain barren so as to resemble leaves; others bear, on one side, at 4 to 6 or 8 inches below the top, a densely clustered panicle of small green or brown flowers; the very numerous peduncles vary from a line or two to above an inch in length, the central smaller ones have but 2 or 3 flowers, the others a considerable number in irregular cymes. Perianth-segments about a line long, very pointed. Capsule about as long, very obtuse or even notched. Stamens usually 3 only.

In wet situations, almost all over the northern hemisphere and in many parts of the southern one. In Britain, one of the commonest species. *Fl. summer*. Two extreme forms are usually distinguished as species, the *dense-flowered R.* (*J. conglomeratus*), with the flowers densely packed in close clusters of about an inch diameter, usually brown; and the *loose-flowered R.* (*J. effusus*), with the panicles much looser, often 2 to 3 inches diameter, and paler-coloured; but every gradation may be observed between them in this respect, as well as in other more minute characters which have been assigned to them respectively.

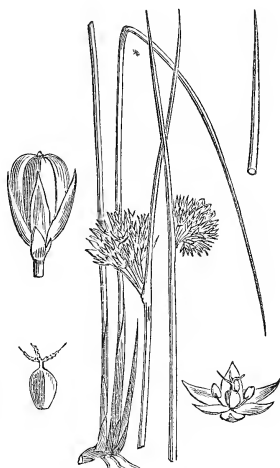


Fig. 1046.

2. **Hard Rush.** *Juncus glaucus*, Ehrh. (Fig. 1047.)

(Eng. Bot. t. 665. *J. diffusus*, Brit. Fl.)

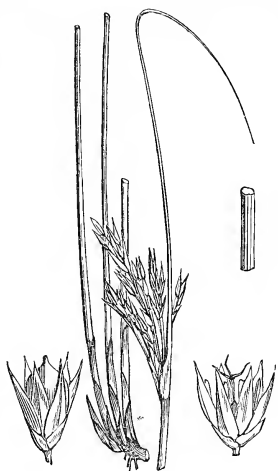


Fig. 1047.

Resembles the *common R.* in its main characters, but the stems are seldom 2 feet high, and although thinner, yet harder and stiffer, and often glaucous; the panicle but 2 or 3 inches below the top; the flowers rather larger, in a much looser and less branched panicle. Capsule of a shining brown, never flattened or hollowed at the top, but rounded or almost pointed. Stamens usually 6.

Spread over Europe and Russian Asia, but not quite so abundantly as the *common R.* Extends all over Britain. *Fl. summer.*

3. **Thread Rush.** *Juncus filiformis*, Linn. (Fig. 1048.)

(Eng. Bot. t. 1175.)



Fig. 1048.

Stems as soft as in the *common R.*, but very slender, and seldom much above a foot high. Clusters of flowers small, usually not above halfway up the stem; the flowers few, much larger than in the *common R.*; the perianth-segments about 2 lines long. Capsule shorter, obtuse, with a short distinct style. Stamens usually 6.

In wet situations, in northern and central Europe and Russian Asia, and the mountain districts of southern Europe. In Britain, only known for certain on the margins of lakes in northern England. *Fl. summer.*

4. Baltic Rush. *Juncus balticus*, Willd. (Fig. 1049.)

(Eng. Bot. Suppl. t. 2621.)

Rootstock more creeping than in any of the foregoing. Stems very stiff and hard, 1 to 2 feet high or more, often prickly at the end. Panicle lateral, more erect and much more dense than in the *glaucous R.*, the flowers larger, usually dark-brown. Perianth-segments broader and not so pointed, especially the inner ones, which are often quite obtuse. Capsule about the same length, obtuse, with a short style. Stamens 6.

Chiefly near the sea, at high northern latitudes, in Europe, Asia, and America. Spread all round the Baltic and along the eastern coasts of the North Sea. In Britain, only in the northern counties of Scotland. *Fl. summer*. It is probably a luxuriant variety of the *arctic R.* (*J. arcticus*), a common plant in the extreme north of Europe and Asia, and reappearing at great elevations in the mountain-ranges of central Europe.

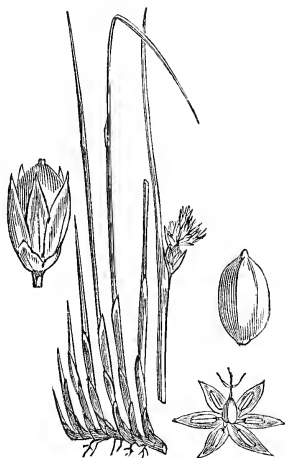


Fig. 1049.

5. Jointed Rush. *Juncus articulatus*, Linn. (Fig. 1050.)

(Eng. Bot. t. 238, *J. lamprocarpus*, t. 2143, *J. uliginosus*, t. 801, *J. nigritellus*, Suppl. t. 2643. *J. acutiflorus*, Brit. Fl.)

An exceedingly variable species in habit and size, but readily known by its leaves, which sheath the stem below, and are cylindrical upwards, and hollow, but divided inside by cross partitions of pith, which give them, especially when dry, the appearance of being jointed. Flowers in little clusters of from 3 or 4 to 8 or 10 or more, arranged in more or less compound terminal panicles; the outer bracts, and sometimes one or two of the others, ending in a short, fine leaf. Perianth-segments about the size of those of the *common R.*, either all pointed or the inner ones obtuse. Capsule more or less pointed, varying from the length of the perianth to half as long again.

Throughout Europe and Russian Asia, from the Mediterranean to the Arctic regions, and at high latitudes in North America. As abundant in Britain as the *common R.* *Fl. all summer*. In rich, moist, deep soils the stems form dense tufts, 2 or 3 feet high, with loose, very



Fig. 1050.

compound, brown or green panicles 5 or 6 inches diameter. In dried-up sandy or muddy places the rootstock is more creeping, with ascending stems, from a few inches to a foot or more, with much less branched panicles of a rich brown. On the edges of ponds and watery ditches the stems will spread over the water, rooting in it at the joints, often covering it to a great extent with dense floating masses. At high elevations the stems are often short and erect, with small panicles of 4 or 5 clusters of dark-brown flowers.

6. **Obtuse Rush.** *Juncus obtusiflorus*, Ehrh. (Fig. 1051.)

(Eng. Bot. t. 2144.)



Fig. 1051.

Probably to be added to the numerous varieties of the *jointed R.*, only differing from the common larger erect form in having all the segments of the perianth obtuse or nearly so, and about as long as the very pointed capsule.

Mixed with the *jointed R.* on the continent of Europe, and in some localities as common. Apparently rare in Britain. *Fl. summer.*

7. Round-fruited Rush. *Juncus compressus*, Jacq.
(Fig. 1052.)

(*J. bulbosus*, Eng. Bot. t. 934, and *J. cænosus*, Suppl. t. 2680.)

Stems 1 to $1\frac{1}{2}$ feet high, erect and rather slender, slightly compressed at the base, with a few nearly radical leaves shorter than the stem, and one or two higher up, all very narrow and channelled or grooved. Flowers arranged singly or scarcely clustered, in a rather loose terminal panicle, of a shining brown. Perianth-segments obtuse, scarcely above a line long. Capsule as long or rather longer, with a short style.

In wet, marshy places, especially near the sea, in Europe and Russian Asia, from the Mediterranean to the Arctic regions. In Britain not so generally spread as some other *Rushes*, and rare in inland districts. *Fl. all summer.*



Fig. 1052.

8. Heath Rush. *Juncus squarrosus*, Linn. (Fig. 1053.)

(Eng. Bot. t. 933.)

Leaves all radical or nearly so, numerous at the base of each stem, and not half its length, very narrow, grooved, stiff, but spreading, rarely longer and more erect. Flower-stem usually under a foot high, rigid, with a terminal, compound but not much branched panicle. Flowers usually distinct, not clustered. Perianth-segments about 2 lines long, rather broad, of a glossy brown, with broad, scarious edges. Capsule about the same length.

On moors and heaths, in drier situations than most *Rushes*, in central and northern Europe and Asia, but scarcely an Arctic plant, although in southern Europe chiefly confined to mountain districts. Abundant in Britain. *Fl. summer.*



Fig. 1053.

9. Toad Rush. *Juncus bufonius*, Linn. (Fig. 1054.)

(Eng. Bot. t. 802.)



Fig. 1054.

A small, pale-coloured annual, with numerous stems, often forming dense tufts, from 1 or 2 to 6 or 8 inches high, branching and flowering almost from the base. Leaves chiefly radical, short and slender. Flowers solitary or rarely 2 or 3 together along the branches, with the lower bracts leaf-like but short. Perianth-segments narrow and pointed, above 2 lines long, of a pale green, with scarious edges, 3 outer ones longer than the 3 others. Capsule oblong, shorter than the perianth.

In wet places, widely spread over the greater part of the world. Abundant in Britain. *Fl.* all summer.

10. Capitate Rush. *Juncus capitatus*, Wieg. (Fig. 1055.)

(Eng. Bot. Suppl. t. 2644.)



Fig. 1055.

A slender, tufted annual, 2 or 3 inches high, resembling the smaller specimens of the *toad R.*, but the flowers are smaller, collected in terminal clusters of 6 or 8, with very rarely a second or third cluster lower down. Stamens usually 3.

In sandy situations, in western and southern Europe, and again in the Netherlands, north Germany, and southern Scandinavia, but in central Europe scarcely eastward of the Rhine. In the British Isles only recorded from Jersey, but is not unlikely to be found in the southern counties of England. *Fl.* summer.

11. Sea Rush. *Juncus maritimus*, Lam. (Fig. 1056.)

(Eng. Bot. t. 1725.)

Stems 2 to 3 feet high, in large tufts, very rigid, terminating in a prickly point, the sheathing scales at their base also terminating each in a stiff, cylindrical, stem-like, prickly leaf, shorter than the real stems. Flowers rather numerous, in little clusters, forming a loose, irregularly compound panicle; the outer bract at its base erect and nearly as long as or longer than the panicle, but more dilated at the base and looking less like a continuation of the stem than in the *common R.* Perianth-segments about $1\frac{1}{2}$ lines long. Capsule rather shorter, or scarcely longer.

In maritime sands, widely spread along the shores of the Atlantic, from North America and Europe far into the southern hemisphere, and along the Mediterranean to the Caspian Sea, but not penetrating far into the Baltic, and not an Arctic plant. Occurs on many parts of the English and Irish coasts, but rare in Scotland. *Fl. summer, rather late.*



Fig. 1056.

12. Sharp Rush. *Juncus acutus*, Linn. (Fig. 1057.)

(Eng. Bot. t. 1614.)

Very near the *sea R.*, but more rigid and prickly, the flowers rather larger, not so numerous, in closer panicles, and usually browner, and the stout capsule is considerably longer than the perianth-segments.

In maritime sands, along the shores of the Atlantic, and up the Mediterranean to the Caspian Sea, but not on those of the North Sea or the Baltic, nor yet recorded from the southern hemisphere. Rather more frequent than the *sea R.* on the south-western coasts of England and South Wales, rarer than that species in Ireland, and does not appear to extend so far to the east or the north in Great Britain. *Fl. summer, rather early.*

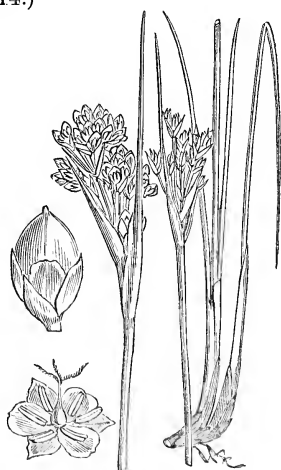


Fig. 1057.

13. Highland Rush. *Juncus trifidus*, Linn. (Fig. 1058.)

(Eng. Bot. t. 1482.)

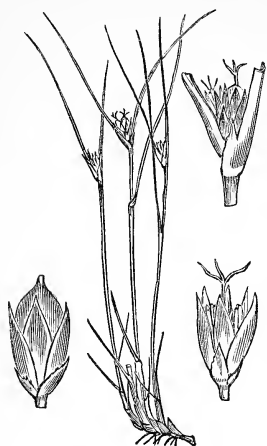


Fig. 1058.

Perennial stock densely tufted, formed of a shortly creeping rootstock and the persistent bases of the numerous stems and closely sheathing brown scales. Stems slender, not 6 inches high, with 2 or 3 slender, filiform leaves or bracts in their upper part, 2 or 3 inches long, the 1 or 2 uppermost having at their base a single sessile flower or a cluster of 2 or 3. Perianth-segments very pointed, rather longer than the capsule.

In rocky and gravelly situations, in northern and Arctic Europe and Asia, and in the higher mountains of central Europe. In Britain, only in the Highlands of Scotland, where it is frequent on stony summits. *Fl. summer.*

14. Chestnut Rush. *Juncus castaneus*, Sm. (Fig. 1059.)

(Eng. Bot. t. 900.)



Fig. 1059.

The rootstock emits creeping runners. Stems 6 inches to a foot high, with a few rather short, grass-like, and channelled radical leaves, and 1 or 2 on the stem itself, all ending in a fine, nearly cylindrical tip. Flowers rather large, dark brown, in 1, 2, or 3 clusters at the top of the stem; the outer bract rather longer than the flowers. Perianth-segments pointed, nearly 2 lines long. Capsule oblong, brown and shining, often nearly twice the length of the perianth.

In wet, rocky places, in the mountains of northern Europe, Asia, and America, extending all round the Arctic Circle, and at great elevations in the principal mountain-chains of central Europe. In Britain, confined to the Scotch Highlands, where it is very local. *Fl. summer.*

15. Two-flowered Rush. *Juncus biglumis*, Linn.

(Fig. 1060.)

(Eng. Bot. t. 898, and *J. triglumis*, t. 899.)

Leaves radical, sheathing the base of the stem, short and grass-like. Stems tufted, 6 to 8 inches high, each with a single terminal cluster of 2, 3, or rarely 5 or 6 rather large, brown flowers; the outer bract seldom longer than the flowers. Perianth-segments obtuse, scarious on the edges, $1\frac{1}{2}$ to 2 lines long. Capsule as long or longer, more or less obtuse.

In mountain bogs, in northern and Arctic Europe, Asia, and America, and at great elevations in the mountain-ranges of central Europe. In Britain, not unfrequent in the Scotch Highlands, extending into northern England and North Wales. *Fl. summer*. Two forms of this plant have been distinguished as species, the *two-flowered* variety (*J. biglumis*), chiefly Arctic, usually with only 2 flowers, a small leafy tip to the outer bract, and a short, very obtuse capsule; and the more common *three-flowered* variety (*J. triglumis*), with 3 or more flowers, no leafy tip to the bract, and a longer, less obtuse capsule; but each of these characters will be found to vary occasionally in the same tuft, and not always to correspond with each other. Both varieties occur in Scotland.

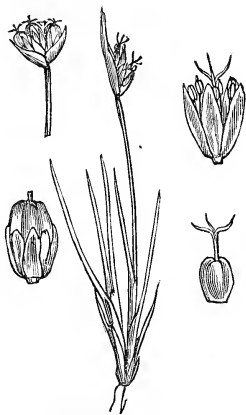


Fig. 1060.

II. WOODRUSH. LUZULA.

Perennial herbs, differing from *Rush* in their softer, flatter, grass-like leaves, often fringed with a few long, white hairs, and especially in their capsules not divided into cells, and containing no more than 3 much larger erect seeds.

A genus widely distributed over the northern hemisphere, usually in woods, meadows, and pastures, in drier situations than the *Rushes*.

Flowers panicled.

Flowers single on each pedicel 1. *Hairy W.*

Flowers in clusters of 2, 3, or 4 on each pedicel.

Plant 2 or 3 feet high, with numerous flowers in a compound panicle 2. *Great W.*

Alpine plant, not 6 inches high, with 3 or 4 small clusters of flowers 3. *Curved W.*

Flowers in compact ovoid heads.

Flower-heads 3 or 4, the outer ones pedicellate 4. *Field W.*

Flower-heads nearly sessile, forming a dense terminal spike 5. *Spiked W.*

1. Hairy Woodrush. *Luzula pilosa*, Willd. (Fig. 1061.)

(*Juncus*, Eng. Bot. t. 736, and *J. Forsteri*, t. 1293. *L. Fosteri*, Brit. Fl. *L. Borreri*, Bab. Man.)



Fig. 1061.

Stock branched and tufted, with creeping offsets. Stems slender and erect, 6 inches to a foot high. Leaves chiefly radical or near the base of the stem, linear and grass-like, 2 or 3 inches long, more or less fringed with long, white hairs. Flowers all distinct, or very rarely two together; the central one nearly sessile, the others on slender peduncles, either simple and 1-flowered or more or less branched, forming an irregular terminal panicle. Each flower has 2 or 3 scarious bracts or glumes at its base. Perianth-segments very pointed, of a shining brown. Capsule longer or scarcely shorter than the perianth. Seeds with a soft, loose, oblique or curved appendage at the top.

In woods and on banks, common in Europe and Russian Asia, from the Mediterranean to the Arctic regions, and in North America. Extends all over Britain. *Fl. spring.* It is usually divided into two species, *L. pilosa*, with the appendage of the seed decidedly curved, and *L. Forsteri*, with that appendage straight or nearly so, but the character is very variable, and does not correspond with the differences in habit which it is sometimes supposed to do.

2. Great Woodrush. *Luzula sylvatica*, Bichen. (Fig. 1062.)

(*Juncus*, Eng. Bot. t. 737.)

Easily known among British species by its large size; the stems

attaining $1\frac{1}{2}$ to 2 feet or more, and the leaves a breadth of 3 or 4 lines and a length of above a foot. Flowers in little clusters of 2 or 3, in a large, loose, compound panicle. Perianth rather smaller than in the *hairy W.*, the segments broader but with a fine point. Capsule nearly of the same length. Seeds without any appendage.

In woods, chiefly in hilly districts, in western, southern, and central Europe, as far as central Germany and western Scandinavia. Extends all over Britain. *Fl.* early summer.



Fig. 1062.

3. Curved Woodrush. *Luzula arcuata*, Hook. (Fig. 1063.)

(Eng. Bot. Suppl. t. 2688.)

A small species, seldom attaining 6 inches, with the leaves channelled almost as in *Rush*, and without the white hairs of our other *Woodrushes*. The panicle consists of 3 or 4 clusters or heads of 3 or 4 flowers each, about half the size of those of the *hairy W.*; the central cluster sessile, the others on rather long, slender, curved peduncles. Capsule nearly globular, shorter than the perianth. Seeds without any appendage.

A high northern species, frequent in Arctic Europe, Asia, and America. In Britain, only on the summits of the Cairngoram and Sutherland mountains in Scotland. *Fl.* summer.



Fig. 1063.

4. **Field Woodrush.** *Luzula campestris*, Br. (Fig. 1064.)
(*Juncus*, Eng. Bot. t. 672, and *L. congesta*, Suppl. t. 2718. *L. multiflora*, Bab. Man.)



Fig. 1064.

The foliage, stature, and white hairs are those of the *hairy W.*, but the flowers, instead of being single, are collected 6 or 8 or more together in close ovoid heads or clusters, of which from 3 to 6 form a small terminal panicle; the central cluster sessile, the others on slender peduncles varying from a line or two to an inch in length. Perianth-segments very pointed, brown, with light-coloured shining edges, about $1\frac{1}{2}$ lines long. Capsule shorter and obtuse.

In dry pastures, woods, and heaths, throughout the northern hemisphere without the tropics, and in some parts of the southern hemisphere. Abundant in Britain. *Fl. spring*. In some specimens the peduncles are so shortened as to give the inflorescence the appearance of that of the *spiked W.*, but the outer clusters are never quite sessile, and the perianth is always much larger than in the *spiked W.*

5. **Spiked Woodrush.** *Luzula spicata*, DC. (Fig. 1065.)
(*Juncus*, Eng. Bot. t. 1176.)



Fig. 1065.

Rather smaller than the *field W.*, and the flowers considerably smaller (about $\frac{3}{4}$ line long), in dense clusters, all sessile, forming an ovoid or oblong terminal spike, $\frac{1}{2}$ to near 1 inch long, and more or less drooping, the lowest 1 or 2 clusters often a little apart from the others, but always sessile within a short leafy bract.

An alpine species, common in northern and Arctic Europe, Asia, and America, and in the high mountain-ranges of central and southern Europe, the Caucasus, and Altai. Abundant in Scotland, very local in northern England and North Wales, and unknown in Ireland. *Fl. summer*.

LXXXV. THE RESTIO FAMILY. RESTIACEÆ.

Herbs, differing from the *Rush* family in their unisexual flowers, and in their ovules and seeds always solitary in each cell of the ovary or capsule, and suspended from the top, not erect from the base as in *Woodrush*.

A considerable Order, comprising, besides the genus *Eriocaulon*, many Australian and South African genera, with a much more rush-like or sedge-like habit.

I. **ERIOCAULON.** ERIOCAULON.

Aquatic or marsh plants, with tufted leaves. Peduncles leafless, with a terminal globular head of minute flowers; the central ones chiefly males, the outer ones chiefly females; all intermixed with small bracts, of which the outer ones are rather larger, forming an involucre round the head. Perianth very delicate, of 4 or 6 segments, the 2 or 3 inner ones in the males united to near the summit. Stamens in the males as many or half as many as the perianth-segments. Capsule in the females 2- or 3-lobed, and 2- or 3-celled. Style single, with 2 or 3 stigmas.

A large genus, widely distributed over the globe, numerous in South America, and extending over that continent to the Arctic Circle, general in tropical Asia, Africa, and Australia, but wholly wanting in Russian Asia and Europe, with the exception of the single British station.

1. **Jointed Eriocaulon.** *Eriocaulon septangulare*, With.

(Fig. 1066.)

(Eng. Bot. t. 733.)

The slender rootstock creeps in the mud under water, emitting numerous white, jointed fibres, and tufts of linear, very pointed, soft and pellucid leaves, 1 to 3 inches long. Peduncles from a couple of inches to above a foot high, enclosed at the base in a long sheath. Flower-head 2 to 4 lines diameter, with very numerous, minute flowers. Bracts and perianths of a leaden colour, tipped with a few minute chaff-like hairs. Perianth-segments 4, with a minute black gland on the

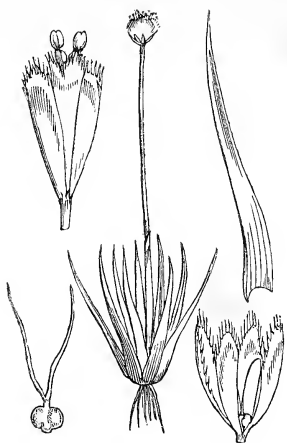


Fig. 1066.

2 inner ones. Stamens in the males 4. Stigmas and lobes of the ovary in the females 2.

A North American species, abundant in the lakes of the isles of Skye, Coll, and a few of the neighbouring Hebrides, and of Connemara, in Ireland, but not elsewhere in Europe. *Fl. August.*

LXXXVI. THE SEDGE FAMILY. CYPERACEÆ.

Herbs, resembling in aspect the *Rushes*, or more frequently the *Grasses*, but usually stiffer than the latter, with solid stems, and the sheaths of the leaves closed all round. Flowers in little green or brown spikes, called *spikelets*, which are either solitary and terminal, or several in a terminal (or apparently lateral) simple or compound cluster, spike, umbel, or panicle. Each spikelet is placed in the axil of a scale-like or leafy *outer bract*, and consists of several scale-like, imbricated bracts, called *glumes*, each containing in its axil one sessile flower. Perianth either none or replaced by a few bristles or minute scales. Stamens 3 or rarely 2. Ovary (in the same or in a distinct glume) simple, 1-celled, the style more or less deeply divided into 2 or 3 branches or linear stigmas. Fruit a small, seed-like nut, flattened when the style is 2-cleft, triangular when it is 3-cleft, containing a single seed.

A large family, abundantly distributed all over the globe, but more especially in moist situations or on the edges of waters. It is intermediate as it were between the *Rushes* and the *Grasses*, distinguished from the former by the absence of any regular perianth, from *Grasses*

generally by the want of an inner scale or palea between the flower and the axis of the spikelets; by the simple, not feathery, branches of the style; besides that in most cases the two families are readily known by the sheath of the leaves closed round the stem in the *Sedges*, slit open on the side opposite to the blade in the *Grasses*. The glumes are also most frequently brown in the former, green or purplish in the latter.

Flowers unisexual, the stamens and ovaries under separate glumes, either in the same or in separate spikelets.

Ovary enclosed in a little bottle-shaped *utricle*, the style protruding through a small aperture at the top . . . 9. *CAREX*.

Ovary within the glume, not enclosed in an utricule. . . 8. *KOBRESIA*.

Flowers hermaphrodite, the stamens and ovaries under the same glume.

Glumes in each spikelet arranged in two opposite rows.

All the glumes in each spikelet, except the outer one, containing flowers. Spikelets many, in a compound umbel 1. *CYPERUS*.

Several of the lower glumes of each spikelet smaller and empty. Spikelets closely sessile, in compact terminal heads 2. *SCHÆNUS*.

Glumes in each spikelet imbricated all round the axis.

Spikelets sessile, in a terminal spike, arranged in 2 opposite rows 5. *BLYSMUS*.

Spikelets solitary, or in heads, clusters, umbels, or panicles.

Several of the lower glumes of each spikelet smaller and empty. Only 2 or 3 flowers at the top of each spikelet.

Spikelets very numerous, in a compound panicle 3. *CLADIUM*.

Spikelets few, in 1 or 2 terminal or pedunculate clusters 4. *BEAKSEGE*.

All the glumes of the spikelet, excepting one outer larger one, containing flowers.

Hypogynous bristles (within the glume round the flowers) projecting far beyond the glumes and forming long cottony or silky tufts 7. *COTTONSEGE*.

Hypogynous bristles shorter than the glumes or none 6. *SCIRPUS*.

I. CYPERUS. CYPERUS.

Stems triangular, leafy at the base. Spikelets in clusters or heads, usually several together in a terminal, irregular, umbel-like panicle,

with an involucre of one or more leaf-like outer bracts. Glumes several in each spikelet, regularly arranged in two opposite rows, all nearly equal, with one flower in each glume. Stamens and ovary under the same glume, without hypogynous bristles.

A very large tropical genus, represented by very few species in temperate regions, and quite disappearing in the extreme north and south. The regular arrangement of the glumes gives the spikelets a flattened appearance readily recognized.

Stem above a foot high. Spikelets numerous. Involucral

leaves very long 1. *Sweet C.*

Stems less than a foot high. Spikelets in a small cluster. In-

volucral leaves not above 3 inches 2. *Brown C.*

1. Sweet Cyperus. *Cyperus longus*, Linn. (Fig. 1067.)

(Eng. Bot. t. 1309. *Galingale*.)



Fig. 1067.

Rootstock creeping. Stem stout, 1 to 3 or even 4 feet high, with a few leaves at the base, usually shorter than the stem. Involucre of about 3 leaves, very unequal in length, the longest often attaining a foot or more. Umbel simple or compound, the central ray very short, the others varying from 1 to 2 or even 3 inches, each bearing a simple or branched cluster of 6 to 12 or more spikelets: these are linear, pointed, flattened, about half an inch long. Glumes numerous, obtuse, of a bright chestnut-colour, with a green keel. Styles 3-cleft.

In wet meadows, and pastures, common in southern Europe and central Asia, extending more sparingly into central France, and along the western provinces to the Channel. In Britain, very local and only in some of the southern counties of England. *Fl. summer, rather late.*

2. Brown Cyperus. *Cyperus fuscus*, Linn. (Fig. 1068.)

(Eng. Bot. Suppl. t. 2626.)

A much smaller plant than the last, forming grass-like tufts a few

inches in height, or very rarely nearly a foot. Leaves shorter than the stem, those of the involucre unequal, the longest from 2 to 4 inches. Clusters compact, either in a small terminal head or in an umbel, of which the longest rays are under an inch. Spikelets much flattened, obtuse, not above 3 lines long, with dark-brown glumes, not near so closely imbricated as in the *sweet C.*

In meadows and waste places, widely distributed over central and southern Europe and across Russian Asia, extending northward to southern Scandinavia. In Britain, only in two localities in Middlesex and Surrey. *Fl. late in summer.*



Fig. 1068.

II. **SCHŒNUS.** SCHŒNUS.

Herbs, usually stiff and rush-like. Glumes arranged, as in *Cyperus*, in two opposite rows, but not more than 4 of the uppermost have flowers in their axils, the 3 or 4 lower ones rather shorter and always empty. There are also occasionally from 3 to 6 minute bristles round the ovary.

A small genus, of which most of the species are from the southern hemisphere.

1. **Black Schœnus.** *Schœnus nigricans*, Linn. (Fig. 1069.)

(Eng. Bot. t. 1121. *Bog Rush.*)

A tufted perennial, with stiff, rush-like stems, about a foot high. Leaves short and stiff, almost radical, their sheaths often of a dark, shining brown. Spikelets several, of a dark, shining brown, almost black, closely sessile, in compact terminal heads, about half an inch in diameter, with an involucre of 2 or 3 broad, brown bracts, one of which at least has a stiff, erect, leaf-like point $\frac{1}{2}$ to 1 inch long. Glumes near



Fig. 1069.

3 lines long, pointed, with a prominent keel, and rough on the edge.

In bogs and marshes, chiefly near the sea, in central and southern Europe, extending eastward to the Caucasus, and northward to the Baltic. Spread over a great part of Britain, but chiefly in the west. *Fl. summer.*

III. **CLADIUM.** CLADIUM.

A single species, distinguished from *Beaksedge* chiefly on account of the thick texture of the fruit. Its habit is very different from that of our *Beaksedges*, but comes very near to that of some exotic species of that genus.

1. **Prickly Cladium.** *Cladium Mariscus*, Br. (Fig. 1070.)

(*Schænus*, Eng. Bot. t. 950.)

A tall, rush-like plant, with a creeping rootstock, and leafy stems, 3 to 6 feet high. Leaves nearly erect, the lowest nearly as long as the stem, smooth and sheathing at the base, then keeled, and ending in a long, triangular point; the keel and edges very rough and cutting, being bordered by minute, sharp teeth. Spikelets of a pale brown, in small but very numerous clusters, arranged in somewhat corymbose panicles in the upper axils, the whole forming a terminal, more or less leafy, oblong panicle, often above a foot long. Each spikelet is 2 or 3 lines long, rather pointed, with the glumes imbricated all round the axis, containing usually one perfect flower in the innermost glume, an

incomplete one in the next, the 4 or 5 outer glumes gradually shorter and always empty. Stamens usually 2. Nut tapering at the top, the outer coating thick and fleshy when fresh, brittle when dry.

In deep bogs and marshy places, in most temperate and some tropical regions of the globe, extending northward in Europe to southern Scandinavia. In Britain, thinly scattered over England and Ireland, and very local in Scotland. *Fl. late in summer.*



Fig. 1070.

IV. BEAKSEDGE. RHYNCHOSPORA.

Spikelets several, in one or more clusters, forming terminal or axillary heads or panicles. Each spikelet oblong, more or less pointed; the glumes imbricated all round the axis, 1 to 3 of the upper or inner ones containing each a flower, the lower or outer ones shorter and empty. Stamens 3 or rarely 2. Hypogynous bristles 6 or sometimes more, shorter than the glumes. Nut globular or laterally flattened, tapering into a 2-cleft style.

A considerable genus, widely dispersed over the surface of the globe, formerly united with *Schænus*, but well distinguished by the glumes imbricated all round the axis, not arranged in two opposite rows.

- Spikelets brown. Outer bract projecting an inch beyond the flowers 1. *Brown B.*
 Spikelets white. Outer bract shorter or scarcely longer than the flowers 2. *White B.*

1. **Brown Beaksedge.** *Rhynchospora fusca*, Sm. (Fig. 1071.)

(*Schænus*, Eng. Bot. t. 1575, *not good*.)

Near the *white B.*, but rather firmer, with a creeping rootstock.



Fig. 1071.

Stem 6 to 10 inches, with few short, erect, subulate leaves; the floral ones or bracts projecting an inch or more beyond the flowers. Spikelets brown, usually forming two rather loose clusters, one terminal, the other on a slender pedicel in the axil of the next leaf; each spikelet about $2\frac{1}{2}$ lines long, containing usually 2 flowers, with 3 or 4 empty outer glumes. Hypogynous bristles about 6, small and very unequal.

In bogs, chiefly in northern and western Europe, in the mountains of central Europe, and in North America. In Britain, confined to southern and western England and Ireland. *Fl. summer.*

2. White Beaksedge. *Rhynchospora alba*, Vahl. (Fig. 1072.)

(*Schænus*, Eng. Bot. t. 985.)



Fig. 1072.

Stems 6 to 9 inches high, slender, forming dense, grass-like tufts, without any creeping rootstock. Leaves chiefly radical, short and subulate; the floral bracts scarcely exceeding the flowers. Spikelets nearly white, in a small, loose terminal cluster, often with one or two smaller clusters on slender peduncles in the axils of the next leaves. Each spikelet 2 to $2\frac{1}{2}$ lines long, with 1 or 2 flowers, and 2, 3, or 4 empty glumes below them. Hypogynous bristles about 12, more apparent than in the *brown B.*, being usually rather longer than the nut, although shorter than the glume.

In bogs, in northern and central Europe, northern Asia, and North America. Generally distributed over Britain. *Fl. summer and autumn.*

V. **BLYSMUS.** BLYSMUS.

Spikelets and flowers of *Scirpus*, but the spikelets are sessile, in two opposite rows, along the axis of a short terminal spike.

A genus limited to the two European species.

Spikelets chestnut-brown, 6- to 8-flowered, and longer

than the glume-like bract at their base 1. *Broad B.*

Spikelets dark-brown, 2- to 4-flowered, almost enclosed in the

long, glume-like bract at their base 2. *Narrow B.*

1. **Broad Blysmus.** *Blysmus compressus*, Panz. (Fig. 1073.)

(*Schœnus*, Eng. Bot. t. 791.)

Stems 6 to 8 inches high, with a creeping rootstock. Leaves much like those of the common *carnation Carex*, shorter than the stem, 1 to $1\frac{1}{2}$ lines broad, flat or keeled. Spike terminal, about an inch long, consisting of about 10 or 12 oblong spikelets, closely sessile on opposite sides of the axis, each one about 3 lines long; the broad, brown, glume-like outer bract shorter than the mature spikelet. Glumes about 8, imbricated all round the axis of the spikelet, the lowest one of all often empty. Stamens usually 3, with 3 to 6 small hypogynous bristles. Nut somewhat flattened, tapering into the 2-cleft style.

In bogs and marshes, in Europe and Russian Asia, not extending to the extreme north, and yet a mountain plant in southern Europe and the Caucasus. Occurs in many parts of England, rarely in Cork County, Ireland, and possibly in southern Scotland, but the following species, or the *black Schœnus*, have often been mistaken for it. *Fl. summer.*



Fig. 1073.

2. **Narrow Blysmus.** *Blysmus rufus*, Link. (Fig. 1074.)

(*Schœnus*, Eng. Bot. t. 1010.)

Stems 6 inches to near a foot high, rather stiff but slender, with a few very narrow leaves near the base, shorter than the stem, erect and



Fig. 1074.

along the west coast of England, and not uncommon in Ireland.
Fl. summer.

channelled or nearly cylindrical. Spike terminal, 6 to 9 lines long, consisting of about 6 sessile spikelets, of a dark, shining brown, almost black, each containing only 2 to 4 flowers, and almost concealed by the outer bract, which is dark brown, thin, and shining, about 3 lines long. Glumes of the spikelet imbricated all round the axis, the lowest one often empty. Stamens 3; the hypogynous bristles minute or wanting. Nut rather larger than in the *broad B.*

In marshy places, especially near the sea, in northern Europe and all across Russian Asia, extending from northern Germany nearly to the Arctic Circle. In Britain, particularly abundant in Scotland and northern England, descending

VI. **SCIRPUS.** SCIRPUS.

Spikelets either solitary and terminal or several together, forming one or more heads or clusters, or an irregular panicle, either terminal or apparently below the top of the stem. Glumes several in each spikelet, imbricated all round the axis, all containing a perfect flower in their axil except sometimes the lowest one. Hypogynous bristles either 6 or fewer and shorter than the glume, or altogether wanting.

A large genus, widely distributed over the whole world, and, like other large genera of *Sedges*, containing species very unlike each other in general habit. It has been repeatedly endeavoured to divide it into several, with characters derived from the hypogynous bristles, the shape of the base of the style, the number of its parts, etc., but the smaller groups so formed still include species as unlike each other as those of the original genus, whilst species closely resembling each other in every other respect have become widely separated. The genus is therefore here retained in its integrity, distinguished from *Beaksedge* by the glumes all bearing flowers except the lowest, from *Cyperus* by the arrangement of the glumes, and from *Blysmus* by the arrangement of the spikelets.

Spikelets solitary on each stem.

Stems branched, leafy, floating in water or in matted tufts on its edge 6. *Floating S.*

Stems simple, erect or ascending.

Outer bract of the spikelet without any leafy tip.

Stems very slender, not 2 inches high. Styles
3-cleft 1. *Needle S.*

Stems rather stiff, 3 or 4 inches to a foot high or more.

Styles mostly 2-cleft 2. *Creeping S.*

Styles mostly 3-cleft.

Sheaths at the base of the stem obtuse or oblique at the top, without any leafy tip.
Spikelets oblong.

Flowers numerous in each spikelet, the thickened base of the style rather bulb-shaped 3. *Many-stalked S.*

Flowers 3 to 6 in each spikelet, the thickened base of the style gradually tapering from the nut 4. *Few-flowered S.*

Sheaths at the base of the stem with a short leafy tip. Spikelet ovoid 5. *Tufted S.*

Outer bract of the spikelet with a leafy tip as long as the spikelet or longer.

Stems rather firm, 6 inches to a foot high, with numerous sheaths at the base, each with a short point 5. *Tufted S.*

Stems very slender, 1 to 6 inches high, with 1 or 2 subulate leaves.

Nut marked with longitudinal ribs and furrows 7. *Bristle S.*

Nut without ribs or furrows 8. *Savi's S.*

Spikelets 2 or more, in a cluster or umbel below the summit of the stem.

Stems very slender, 1 to 6 inches high, with 1 or 2 subulate leaves.

Nut marked with longitudinal ribs and furrows 7. *Bristle S.*

Nut without ribs or furrows 8. *Savi's S.*

Stems firm, 1 to 2 feet high or more.

Stems leafless, or with 1 or 2 short, stiff leaves at the base.

Stems acutely triangular from near the base.

Spikelets all sessile, in a close cluster. Leaf-blade narrow, 2 or 3 inches long 10. *Sharp S.*

Spikelets more or less pedicellate, in a compound cluster. Leaf-blade very short 11. *Triangular S.*

Stems cylindrical, or scarcely angular at the top.

- Spikelets very small but very numerous, densely packed in one or more small, globular heads 9. *Clustered S.*
 Spikelets rather large, in a cluster or irregular umbel 12. *Lake S.*
Stems bearing several long leaves.
 Spikelets large, brown, in a sessile cluster or close compound umbel 13. *Sea S.*
 Spikelets small, green, very numerous, in a large, loose, compound panicle 14. *Wood S.*

1. Needle Scirpus. *Scirpus acicularis*, Linn. (Fig. 1075.)

(Eng. Bot. t. 749. *Eleocharis*, Brit. Fl.)

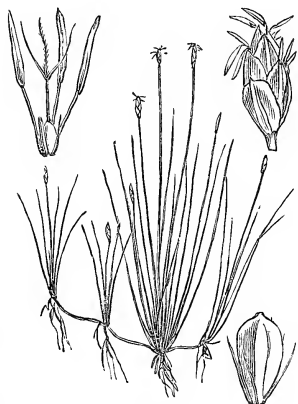


Fig. 1075.

A little, slender, tufted plant, with the appearance of an annual, but emitting thread-like, creeping rootstocks; the fine subulate stems scarcely 2 inches high, with short sheaths at their base, and most of them bearing a single terminal oblong spikelet, not 2 lines long, of a dark-brown colour, the outer bract similar to the glumes. Flowers usually 6 to 8 in the spikelet. Hypogynous bristles 3 or 4. Styles 3-cleft. Nut obovoid, slightly triangular.

In wet, sandy places, the margins of lakes, etc., widely spread over Europe and central and Russian Asia, and north America. Not uncommon in England, Ireland, and some parts of Scotland. *Fl. summer and autumn.*

2. Creeping Scirpus. *Scirpus palustris*, Linn. (Fig. 1076.)

(Eng. Bot. t. 131. *Eleocharis*, Brit. Fl.)

Rootstock often creeping to a considerable extent, with numerous erect stems, often densely tufted, and not 6 inches high at the edge of the water, more distant, and a foot high or more when in the water; all leafless, except one or two short sheaths at their base, without leafy tips. Spikelets solitary and terminal, oblong, 4 to 6 lines long. Glumes numerous, closely imbricated, brown, with scarious edges, and green on the midrib; the outer bract only differing from the glumes in being rather larger. Hypogynous bristles usually 4. Style 2-cleft. Nut obovate, crowned by a little conical tubercle, being the persistent base of the style.

On the edges of pools and watery ditches, throughout the northern hemisphere, and in some parts of the southern one. Frequent in Britain. *Fl. all summer*. Specimens with the outer bract rather broader, so as almost to enclose the base of the spike, have been distinguished as a species under the name of *S. uniglumis*.

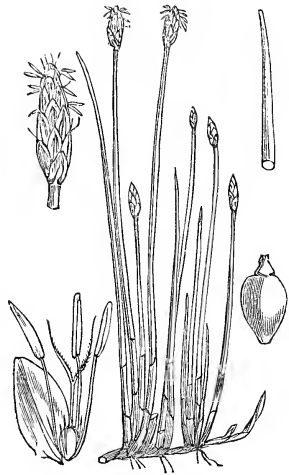


Fig. 1076.

3. Many-stalked Scirpus. *Scirpus multicaulis*, Sm.

(Fig. 1077.)

(Eng. Bot. t. 1187. *Eleocharis*, Brit. Fl.)

Very much like the last, and perhaps a mere variety, but smaller, forming dense tufts, with a few creeping offsets; the stems more slender, often slightly decumbent at the base, many of them barren and leaf-like. Spikelet rather smaller. Styles usually, but not always, 3-cleft, the nut becoming obovoid and triangular. Hypogynous bristles usually 6.

In similar situations to the *creeping S.*, and often mixed with it, but not so much in the water; recorded chiefly from northern and western Europe. Not unfrequent in Britain. *Fl. summer*.

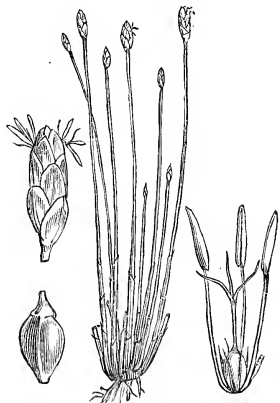


Fig. 1077.

4. Few-flowered Scirpus. *Scirpus pauciflorus*, Lightf.
(Fig. 1078.)

(Eng. Bot. t. 1122.)

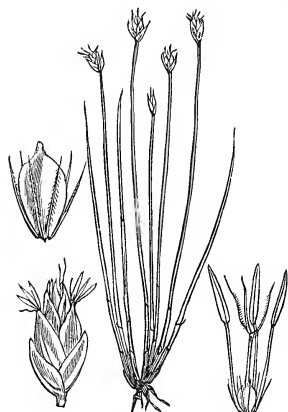


Fig. 1078.

In appearance much like a starved, slender state of the last two species, whilst the nut is nearer that of the *tufted S.* Stems slender, and many of them barren, not 6 inches high, the sheaths without leafy tips. Spikelet small, not containing above 5 or 6 flowers. Hypogynous bristles, 3-cleft style, and obovoid nut, as in the *many-stalked S.*, but the thickened base of the style is considerably narrower, forming a tapering point to the nut, not a conical tubercle.

In wet mud, and the edges of pools, in northern and central Europe, and Russian Asia, and the mountains of southern Europe and the Caucasus, but scarcely an Arctic plant. In Britain, more frequent in Scotland, Ireland, and northern England than in the south. *Fl. summer.*

5. Tufted Scirpus. *Scirpus cæspitosus*, Linn. (Fig. 1079.)

(Eng. Bot. t. 1029.)

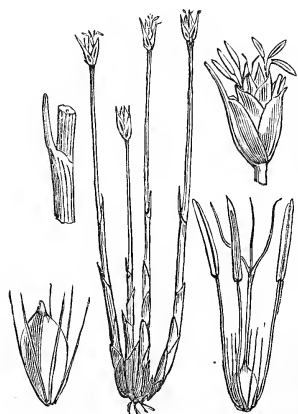


Fig. 1079.

Stem 6 inches to a foot high, densely tufted, covered for an inch or two at their base with closely imbricated sheaths, the outer ones brown, the inner ones green, with narrow, leafy tips, 1 to 2 lines long. Spikelets solitary and terminal, ovoid, brown, scarcely above 2 lines long; the outer bract like the glumes but larger, with an almost leafy tip, about the length of the spikelet. Flowers usually 6 to 8 in the spikelet. Hypogynous bristles about 6. Style 3-cleft, the persistent base very minute.

In marshes and bogs, common in northern and Arctic Europe, Asia, and America, but restricted to mountain-ranges in central and southern Europe, and not

recorded from the Caucasus. Frequent in Britain, excepting some of the southern counties of England. *Fl. summer.*

6. Floating Scirpus. *Scirpus fluitans*, Linn. (Fig. 1080.)

(Eng. Bot. t. 216. *Isolepis*, Brit. Fl.)

Easily known by its long, slender, branching stems, either floating on the water, or forming soft, densely matted masses on its margin, with linear-subulate leaves, $\frac{1}{2}$ to 2 inches long. Spikelets solitary and terminal, oblong, greenish, not 2 lines long, the outer bract without any leafy point. Flowers without hypogynous bristles. Styles 2-cleft.

In pools and still waters, generally distributed over Europe, and re-appearing in the southern hemisphere, but not recorded from Asia or America. Scattered over the whole of Britain, but not very common. *Fl. summer.*



Fig. 1080.

7. Bristle Scirpus. *Scirpus setaceus*, Linn. (Fig. 1081.)

(Eng. Bot. t. 1693. *Isolepis*, Brit. Fl.)

Stems slender, 2 or 3 inches high, forming little dense tufts, with 1 or 2 short, subulate leaves on each stem, sheathing it at the base. Spikelets solitary, or 2 or 3 together in a little cluster, appearing lateral, the subulate point of the outer bract forming a continuation of the stem. Each spikelet is ovoid, seldom 2 lines long; the glumes broad and short, dark-brown, with a green midrib. No hypogynous bristles. Style 3-cleft. Nut very small, marked with about 8 longitudinal ribs and furrows, only visible under a magnifying-glass.

In muddy places, on the margins of pools, etc., in Europe and Russian Asia, from the Mediterranean nearly to the Arctic Circle. Generally distributed over Britain. *Fl. summer.*

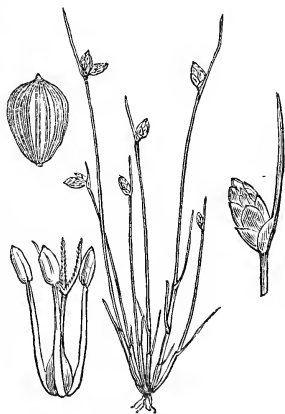


Fig. 1081.

8. Savi's Scirpus. *Scirpus Savii*, Seb. et Maur. (Fig. 1082.)
(Eng. Bot. Suppl. t. 2782. *Isolepis*, Brit. Fl.)



Fig. 1082.

Very like the *bristle S.*, but usually still more slender, although sometimes attaining 6 or 8 inches; the point of the outer bract scarcely exceeds the spikelet, and the nut has not the longitudinal ribs and furrows of the *bristle S.*

In marshes, and edges of pools, chiefly near the sea, frequent in the southern hemisphere, and in the Mediterranean region of the northern hemisphere, extending along the western coasts to the British Channel. In Britain, on the southern and western coasts of England, the west of Scotland, and Ireland. *Fl. summer.*

9. Clustered Scirpus. *Scirpus Holoschoenus*, Linn. (Fig. 1083.)
(Eng. Bot. t. 1612. *Isolepis*, Brit. Fl.)



Fig. 1083.

A stiff, rush-like plant, with a stout, creeping rootstock, and cylindrical stems, 1 to 2 feet high or even more, with 1 or 2 stiff leaves sheathing the base. Spikelets very numerous and small, closely packed into one or more globular heads, forming a lateral cluster or umbel, the largest stiff outer bract forming an apparent continuation of the stem. The largest heads are seldom above 4 or 5 lines diameter, and contain upwards of 30 spikelets, of a light brown colour, each containing many flowers. No hypogynous bristles. Style 2-cleft or rarely 3-cleft.

In moist places, chiefly near the sea, in the Mediterranean region, extending eastward into central Asia, and northward in western Europe to the Loire, and here and there into central Europe.

In Britain, only in two neighbouring localities in North Devon and Somerset. *Fl. late in summer.*

10. Sharp Scirpus. *Scirpus pungens*, Vahl. (Fig. 1084.)

(Eng. Bot. Suppl. t. 2819.)

Very near the *triangular S.*, but a rather smaller plant; one or two of the sheaths bear narrow, keeled leaves, 1 to 3 inches long, and the spikelets are few (usually 3 to 6), all sessile, in a close cluster; the stiff, triangular, outer bract continuing the stem as in the *triangular S.*

In bogs, marshes, and on the margins of pools, chiefly in North America and the West Indies, but occurs occasionally in western Europe, and has been found on the banks of St. Ouen's Pond, in Jersey. *Fl. summer, rather late.*

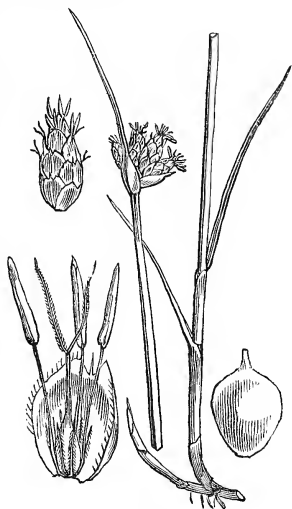


Fig. 1084.

11. Triangular Scirpus. *Scirpus triqueter*, Linn. (Fig. 1085.)

(Eng. Bot. t. 1694.)

Rootstock creeping. Stems acutely triangular, 2 or 3 feet high, leafless, except that the one or two loose sheaths at the base bear a short lanceolate blade, from a couple of lines to near an inch long. Spikelets usually 8 or 10 or even more, the central ones sessile, the others stalked, forming a compound lateral cluster or umbel; the stiff, triangular outer bract continuing the stem for an inch or more. Each spikelet is ovoid, 4 or 5 lines long; the glumes brown, broad, usually notched or fringed at the top, with a minute point. Hypogynous bristles about 5. Style 2-cleft. Nut smooth and shining.

In marshes, and edges of pools, in central and southern Europe, extending eastward to the Caucasus, and north-



Fig. 1085.

ward chiefly in western Europe to Denmark. Rare in Britain, and probably limited to the banks of the Arun, in Sussex, and of the Thames, near London. *Fl. late in summer.*

12. Lake Scirpus. *Scirpus lacustris*, Linn. (Fig. 1086.)

(Eng. Bot. t. 666.)



Fig. 1086.

Rootstock creeping, with stout, erect stems, from 2 or 3, to 6 or 8 feet high, cylindrical at the base, gradually tapering upwards, and sometimes obtusely triangular near the top, with a single short leaf near the base. Spikelets ovoid or oblong, 3 to 6 lines long, rather numerous, in a compound lateral umbel or cluster, the outer bract continuing the stem. Glumes numerous, broad, brown, fringed at the edge, notched at the top, with a little point in the notch. Hypogynous bristles 5 or 6. Style 2- or 3-cleft. Nut smooth.

On the margins of lakes and ponds, and in watery ditches, extending all over Europe and Russian Asia, from the Mediterranean to the Arctic regions, and in North America. Abundant in Britain. *Fl. summer.* Two varieties are often distinguished as species, the

S. lacustris, with 3-cleft style and smooth glumes, and the *S. tabernaemontani*, or *S. glaucus* (Eng. Bot. t. 2321), with a 2-cleft style and raised dots on the glumes; but these characters are very inconstant, and there are often 2-cleft and 3-cleft styles in the same spikelet. The name of *S. Duvalii*, or *S. carinatus* (Eng. Bot. t. 1913), is sometimes given to a variety of the lake *S.* with the stems rather more triangular at the top, sometimes to a slight variety of the *triangular S.*

13. Sea Scirpus. *Scirpus maritimus*, Linn. (Fig. 1087.)

(Eng. Bot. t. 542.)

Rootstock creeping. Stems sharply triangular, 2 to 4 or even 5 feet high, with long, flat, pointed leaves, often far exceeding the stem. Spikelets of a rich brown, ovoid or lanceolate, about 9 lines long, sometimes only 2 or 3 in a close sessile cluster, more frequently 8 to 10

in a compound cluster, the outer ones stalked. The leaf-like outer bract continues the stem, and sometimes one or two other bracts have leafy points. Glumes notched, with a fine point. Style 3-cleft. Hypogynous bristles few.

In salt-marshes, and occasionally up the banks of large rivers in most parts of the world, though less frequent within the tropics. Common all round the coasts of Britain. *Fl. summer.*



Fig. 1087.

14. Wood Scirpus. *Scirpus sylvaticus*, Linn. (Fig. 1088.)

(Eng. Bot. t. 919.)

Stems triangular, 2 or 3 feet high, with long, grass-like leaves. Spikelets ovoid, of a dark shining green, not above 2 lines long, very numerous, in clusters of 2 or 3 together, forming a terminal, much branched, compound umbel or panicle, with an involucre of 2 or 3 linear leaves. Glumes keeled and pointed. Hypogynous bristles usually 6. Style 3-cleft.

In moist woods, and on grassy banks of rivers, throughout Europe and Russian Asia, except the extreme north, and in North America. Scattered over England, Ireland, and southern Scotland, and abundant in some localities, but not generally a common plant. *Fl. summer.*



Fig. 1088.

VII. **COTTONSEDE.** ERIOPHORUM.

Habit and characters of *Scirpus*, except that the hypogynous bristles as the flowering advances, protrude to a great length beyond the glumes, forming silky-cottony tufts, which have given to these plants the name of *Cotton-rushes* or *Cotton-grass*. The style is usually 3-cleft.

A genus of few species, all bog plants, restricted to the northern hemisphere, and most abundant in high latitudes or at considerable elevations.

Spikelets solitary.

Spikelets 2 or 3 lines long, oblong, and brown. Hypogynous bristles 6 to each flower 1. *Alpine C.*

Spikelets above 6 lines long, ovoid, of a dark olive-green.

Hypogynous bristles very numerous 2. *Sheathing C.*

Spikelets several to each stem 3. *Common C.*

1. **Alpine Cottonsedge.** *Eriophorum alpinum*, Linn.

(Fig. 1089.)

(Eng. Bot. t. 311.)



Fig. 1089.

In everything but the long bristles this plant precisely resembles the *tufted Scirpus*. It has the same densely tufted stems, 6 to 10 inches high, with imbricate sheaths at the base; the inner ones with very short leafy tips, and small, brown, solitary and terminal spikelets. After flowering the hypogynous bristles, about 6 to each flower, form a silky tuft attaining an inch in length.

In bogs, in the high mountain ranges of Europe and Russian Asia, or at high latitudes all round the Arctic Circle. In Britain it is perhaps now extinct, the bog, near Forfar where it was formerly found being now drained, and if it be not found in other parts of the Scotch Highlands it must be expunged

from our Flora. *Fl. summer.*

2. **Sheathing Cottonsedge.** *Eriophorum vaginatum*, Linn.

(Fig. 1090.)

(Eng. Bot. t. 873.)

Stems tufted, a foot high or more, covered at the base with a few loose

ragged sheaths, one or two of which bear linear, almost subulate leaves, shorter than the stem, and one or two of the upper sheaths inflated, without any or only a very short blade. Spikelet solitary, terminal, ovoid, 6 to 8 lines long, of a deep olive-green. Hypogynous bristles very numerous to each flower, forming at length very dense cottony tufts, nearly globular, about an inch in diameter.

In bogs and wet moors, in northern and central Europe, Russian Asia, and North America, and in the mountains of southern Europe. Extends all over Britain, but especially abundant in the mountains of Scotland and Ireland. *Fl. summer.*



Fig. 1090.

3. Common Cottonsedge. *Eriophorum polystachyum*, Linn. (Fig. 1091.)

(Eng. Bot. t. 563. *E. angustifolium*, t. 564, *E. gracile*, t. 2402, *E. pubescens*, t. 2633, and *E. gracile*, Suppl. t. 2886.)

Rootstock creeping. Leaves few, mostly radical, much shorter than the stem, more or less triangular, or channelled at the top or all the way along, those on the stem often very short. Stems about a foot high, with a terminal umbel of 2 or 3 to 8 or 10 or even more spikelets; the inner ones sessile, the outer ones more or less stalked and often drooping; the 1 to 3 outer bracts more or less leafy. Each spikelet ovoid or oblong, 5 or 6 lines long; the glumes thin, of an olive-green, with scarious edges, or sometimes altogether brown. Hypogynous bristles very numerous, forming dense cottony tufts, often attaining 1 to 1½ inches in length.

In bogs and wet moors, the commonest species in Europe, Russian Asia, and North America. Frequent in Britain. *Fl. summer.* It is usually divided into



Fig. 1091.

3 species, the *broad-leaved C.* (*E. latifolium*), with leaves flattened the greater part of their length; the *slender C.* (*E. gracile*), with very slender leaves, and few, almost erect spikelets; and the *narrow-leaved C.* (*E. angustifolium*), with intermediate leaves and more numerous spikelets. Other characters, derived from the smoothness or roughness of the peduncles, or from the length of the cottony bristles, do not appear to be near so constant as has been supposed.

VIII. KOBRESIA. KOBRESIA.

Perennial herbs, with grass-like leaves, radical or sheathing the stems at the base. Spikelets sessile in a terminal spike, simple or rarely branched at the base, with a glume-like bract under each spikelet. In each spikelet the lowest glume encloses an ovary with a long trifid style, the next one or rarely two glumes enclose 3 stamens, and there is often a small rudimentary glume or awn terminating the axis. Some spikelets have only one glume enclosing an ovary, and some, near the end of the spike, have only one glume with 3 stamens.

Besides the British species the genus comprises one or two from the continent of Europe.

1. Sedge-like Kobresia. *Kobresia caricina*, Willd.

(Fig. 1092.)

(*Schænus monoicus*, Eng. Bot. t. 1410.)



Fig. 1092.

A low, *Carex*-like plant, forming dense tufts seldom above 6 inches high; the leaves radical or sheathing the stems at the base, spreading, and much shorter than the stem. Spikelets 4 or 5, short and brown, closely sessile in a short terminal spike. In each spikelet the lower flowers are female, consisting within the glume of an ovary with a 3-cleft style. The upper spikelets of the spike and usually one terminal flower of the lateral spikelets are males, consisting of 3 stamens within the glumes. Sometimes the lower spikelets are slightly compound or branched.

In moors and wet places, in the mountains of northern and central Europe, and in the Caucasus. In Britain, only

in a few localities in Perthshire and in the north of England. *Fl. summer.*

IX. CAREX. CAREX.

Herbs, mostly perennial, with Grass-like leaves, chiefly radical or on the lower part of the stem. Spikelets solitary or several in a terminal spike, or the lower ones distant or stalked, or rarely forming a short compound spike or dense panicle. Flowers unisexual, the stamens and pistils always in separate glumes, either in separate spikelets or in different parts of the same spikelet, which is then called *mixed* or *androgynous*. Glumes imbricated all round the axis. Stamens in the males 3, or rarely 2, without bristles or inner scales. Ovary in the females enclosed within a bottle-shaped or inflated *sack* or *utricle*, contracted at the top, with a small opening through which protrudes the 2-cleft or 3-cleft style. This sack persists round the nut, forming an angular or bladdery outer covering to the seed-like fruit. It is by some botanists considered as a perianth, but various circumstances are against that supposition, and its real analogies are not as yet satisfactorily made out.

A very large and well-defined genus, widely spread over Europe, northern Asia, and North America, extending into the mountain-ranges of the tropics, and the extratropical regions of the southern hemisphere. The great conformity of the essential characters of the genus renders it difficult to break it up into well-marked sections, and the main divisions are usually taken from the relative position of the male and female spikelets or of their male and female portions. These characters are readily appreciated when the plant is in flower, but when in fruit, a state in which it is necessary to procure it in order to determine the species with accuracy, it requires some attention not to overlook the few male flowers at the base or at the top of the mixed spikes, as, the stamens having fallen away, they then appear like empty glumes.

- | | | |
|-----|--|----|
| 1 { | Spikelet solitary and terminal | 2 |
| | Spikelets several, the terminal one mixed, the rest female or mixed | 5 |
| | Spikelets several, the terminal one or more male (rarely with a very few female flowers at the base), the others female or mixed | 23 |

Spikelets solitary, terminal.

- | | | |
|-----|---|-----------------------|
| 2 { | Spikelet wholly male or wholly female | 3 |
| | Spikelet mixed, male at the top, female at the base | 4 |
| 3 { | Male and female spikelets on different plants | 1. <i>Diœcious C.</i> |
| | Female spikelet on a long peduncle arising from the base of the male stem | 24. <i>Dwarf C.</i> |

- 4 { Spikelet above 6 lines long. Stigmas 2. Fruits tapering to a point. 2. *Flea C.*
 Spikelet above 6 lines long. Stigmas 3. Fruits obovoid, obtuse. 3. *Rock C.*
 Spikelet not above 4 lines. Flowers very few. Stigmas 3. Fruit tapering. 4. *Few-flowered C.*

Spikelets several, the terminal one mixed.

- 5 { Spikelets all sessile in a simple or branched, close or interrupted spike. Stigmas 2 6
 Lower spikelets generally stalked. Stigmas 3 20
 6 { Terminal spikelet male at the base. Spike simple 7
 Terminal spikelet male at the top. Spike often branched or compound 13
 7 { Spikelets forming a terminal spike without leafy bracts, or with only a small one to the lowest spikelet 8
 Spikelets very distant, the lower ones each in the axil of a long leafy bract 12
 8 { Spikelets ovoid, close together. Fruits tapering to a point, erect or scarcely spreading 9
 Spikelets, at least the lower ones, at some distance from each other . 10
 9 { Fruits winged at the edges. Stems usually a foot high or more 5. *Oval C.*
 Fruits not winged. Stems usually 8 or 9 inches high . 6. *Hare's-foot C.*
 10 { Fruits tapering to a point or beak considerably longer than the glume 11
 Fruits erect, ovate, with a minute point. Stems a foot or more. Spikelets pale green 9. *Whitish C.*
 11 { Ripe spikelets nearly globular, with very spreading beaked fruits. Stem 6 or 8 inches 8. *Star-headed C.*
 Ripe spikelets oblong, with rather spreading pointed fruits. Stem 1 to 2 feet 7. *Elongated C.*
 12 { All the spikelets simple, sessile, and distant 10. *Remote C.*
 Lower spikelets branched or 2 or 3 together. Upper ones rather near together 11. *Axillary C.*
 13 { Stems tufted, without creeping rootstocks 14
 Rootstock long and creeping 18
 14 { Spike compound or branched. Stems 1 to 4 feet (usually 2 to 3 feet) 15
 Spike simple or the lower spikelets slightly compound. Stems not a foot or very slender 16
 Spike or panicle dark brown, rather loose. Fruits obtusely 3-angled. 12. *Panicled C.*
 15 { Spike cylindrical, often green, densely crowded. Fruits much flattened, with acute angles. Stem acutely triangular . . 13. *Fox C.*
 Spikelets near together, in a terminal brown spike about an inch long.
 16 { 14. *Prickly C.*
 Lower spikelets distant, all pale brown or green 17
 17 { Fruiting spikelets globular, no male flowers at their base . 14. *Prickly C.*
 Fruiting spikelets oblong, a few males at the base of some of them. Fruits flattened 11. *Axillary C.*

- 18 { Spikelets rather large, ovoid, in a spike of 1 or 2 inches. Fruit with
very thin or winged edges 15. *Sand C.*
- 18 { Spikelets short, in a spike of about $\frac{1}{2}$ inch. Fruit very convex, not
winged 19
- 19 { Spike ovoid, the spikelets distinct. Stem slender, erect. 16. *Divided C.*
- 19 { Spike nearly globular, very dense. Stem short, curving downwards.
17. *Curved C.*
- 20 { Spikelets short, erect 21
- 20 { Spikelets oblong or cylindrical, stalked and drooping 22
- 21 { Spikelets at length rather distant, the lowest scarcely stalked. Fruit
ovoid, obtuse 22. *Buxbaum's C.*
- 21 { Spikelets close together, the lowest stalked. Fruit angular, shortly
beaked 21. *Alpine C.*
- 21 { Spikelets oblong, very black. Fruit triangular, with a short beak.
23. *Black C.*
- 22 { Spikelets cylindrical, green. Glumes and fruits with long subulate
points 43. *Cyperus-like C.*

Spikelets several, one or more terminal ones wholly male.

- 23 { Stigmas 2 24
- 23 { Stigmas 3 27
- 24 { Spikelets small, green, and distant, lower one branched or clustered.
11. *Axillary C.*
- 24 { Spikelets cylindrical or oblong, few, dark-brown or black 25
- 25 { Fruits very convex or inflated 18. *Russet C.*
- 25 { Fruits nearly flat 26
- 26 { Glumes mostly obtuse. Spikelets $\frac{1}{2}$ to 2 inches long 19. *Tufted C.*
- 26 { Glumes mostly narrow and pointed. Female spikelets 3 inches or
more 20. *Acute C.*
- 27 { Bracts sheathing, without leafy tips. (Fruits obtuse, slightly downy) 28
- 27 { Bracts, at least the lower ones, leafy, with or without sheaths 29
- 28 { Stems shorter than the leaves. Female spikelets short, distant, half-
included in the sheaths 24. *Dwarf C.*
- 28 { Stems longer than the leaves. Female spikelets near the top, linear,
spreading 25. *Fingered C.*
- 29 { Fruits downy or hairy 30
- 29 { Fruits glabrous 35
- 30 { Female spikelets short and compact, close under the males 31
- 30 { Female spikelets oblong or cylindrical, the lower ones distant 33
- 31 { Lowest bract shortly sheathing, with a short leafy point *Vernal C.*
- 31 { Lowest bract shortly leafy, without any sheath 32
- 32 { Fruits not above a line long, very shortly downy 28. *Pill-headed C.*
- 32 { Fruits near 2 lines long, hairy 27. *Mountain C.*
- 33 { Bracts without any or with very short sheaths 34
- 33 { Bracts with long sheaths. Fruits hairy, beaked, 2 lines long. Spike-
lets very distant 31. *Hairy C.*

- Spikelets rather distant, very compact. Fruits not a line long, and not beaked 29. *Downy C.*
 34 { Spikelets very distant. Fruits near 2 lines long, tapering into a beak. 30. *Slender C.*
 { One terminal male spikelet (rarely with a smaller one close under it).
 Female spikelets erect. Bracts leafy, with sheaths 36
 35 { One terminal male spikclet. Females more or less drooping. Bracts
 with or rarely without sheaths 44
 Two or three male spikelets. Bracts without sheaths, or rarely the
 lowest one sheathing 49
 36 { Fruits obtuse, without any or only a very minute beak 37
 Fruits tapering into a beak 38
 37 { Female spikelets short, oblong, pale. Fruit very obtuse 32. *Pale C.*
 Female spikelets cylindrical. Glumes dark. Fruit often with a
 minute beak 37. *Carnation C.*
 38 { Female spikelets compact, nearly sessile 39
 Female spikelets loose, cylindrical, stalked 42
 39 { Leafy bracts very narrow, much longer than the stem 33. *Long-bracted C.*
 Leafy bracts short, or very rarely exceeding the stem 40
 40 { Female spikelets short, yellowish-green, mostly near the top of the stem.
 Fruits very spreading 34. *Yellow C.*
 Female spikelets oblong, brown, very distant. Fruits with an erect or
 slightly spreading beak 41
 41 { Fruit ribbed 35. *Distant C.*
 Fruit smooth 36. *Dotted C.*
 42 { Female spikelets green. Fruits with a long beak 43
 Female spikelets brown. Fruits with a very short beak 37. *Carnation C.*
 43 { Peduncles of the lower spikelets very long 41. *Wood C.*
 Peduncles of the lower spikelets short 35. *Distant C.*
 44 { Female spikelets short, or very brown (seldom above an inch) 45
 Female spikelets greenish, 1 to 6 inches long 46
 45 { Female spikelets light brown, loose. Lower bracts leafy, with long
 sheaths. Fruits beaked 38. *Capillary C.*
 Female spikelets pale green, oblong. Lower bracts leafy, with short
 sheaths. Fruits not beaked 32. *Pale C.*
 Female spikelets dark brown. Bracts almost without sheaths. Fruits
 compressed, not beaked 39. *Mud C.*
 Female spikelets brown, cylindrical. Sheaths variable. Fruits ovoid,
 not beaked 40. *Glaucous C.*
 46 { Female spikelets distant, not crowded. Stems weak and leafy 47
 Female spikelets not very distant. Flowers crowded. Stems stout,
 3 to 5 feet 48
 47 { Female spikelets about an inch, on slender stalks. Fruits rather long
 beaked 41. *Wood C.*
 Female spikelets about 2 inches, very slender. Stalks almost concealed
 in the sheaths. Fruits short-pointed 42. *Thin-spiked C.*

- 48 { Female spikelets about 2 inches, on slender stalks. Glumes and fruits spreading, with long points 43. *Cyperus-like C.*
 { Female spikelets 4 to 6 inches. Stalks almost concealed in the sheaths.
 { Fruits small, scarcely beaked 44. *Pendulous C.*
 49 { Fruits obtuse. Spikelets dark brown. Leaves glaucous 40. *Glaucous C.*
 { Fruits beaked or pointed. Spikelets brown-green. Stems tall, with long leaves 50
 50 { Fruits much flattened, pointed 47. *Marsh C.*
 { Fruits inflated, abruptly contracted into a long beak . . . 45. *Bottle C.*
 { Fruits inflated, tapering into a short beak 46. *Bladder C.*

1. **Dicæcious Carex.** *Carex dioica*, Linn. (Fig. 1093.)

(Eng. Bot. t. 543, and *C. Davalliana*, t. 2123.)

A slender dicæcious plant, seldom above 6 or 8 inches high, with a creeping rootstock; the leaves very narrow, much shorter than the stem, the radical ones loosely tufted. Spikelets brown, solitary on each stem; those of the male plant linear, about 6 lines long; the females much shorter, and ovoid. Fruits longer than the glumes, contracted into a point, and more or less spreading when ripe. Styles 2-cleft.

In spongy bogs, in northern and Arctic Europe, Asia, and America, and in the mountain ranges of central Europe. Common in Scotland, northern England and Ireland, but very rare in the south. *Fl.* early summer.



Fig. 1093.

2. **Flea Carex.** *Carex pulicaris*, Linn. (Fig. 1094.)

(Eng. Bot. t. 1051.)

A small tufted species, not creeping, 3 to 6 inches high, the leaves narrow, almost subulate, shorter than the stem. Spikelet solitary and terminal, about 9 lines long, male in the upper half, 3 to 7 of the lower flowers female. Style 2-cleft. Fruit ovate, sessile, and erect when



Fig. 1094.

young, becoming oblong, pointed, contracted at the base, and horizontally spreading when ripe, and then near 2 lines long.

In wet meadows and bogs or moist hilly pastures, in northern Europe and Asia, and in the mountains of central and southern Europe to the Caucasus. Generally spread over Britain. *Fl.* early summer.

3. Rock Carex. *Carex rupestris*, All. (Fig. 1095.)

(Eng. Bot. Suppl. t. 2814.)



Fig. 1095.

Rootstock creeping. Leaves in loose tufts, broader and flatter than in the *flea C.*, but ending in a long, fine point. Stems 3 to 6 inches high, with a linear, mixed spikelet like that of the *flea C.*, but the style is 3-cleft, and the fruit is shorter, obovoid, not pointed, and not so spreading. The lower glumes often bear a fine deciduous point.

On wet rocks and moors, in the mountains of northern and Arctic Europe and Asia, and the higher ranges of central Europe. In Britain, limited to the higher mountains of Scotland. *Fl.* summer.

4. Few-flowered Carex. *Carex pauciflora*, Lightf.

(Fig. 1096.)

(Eng. Bot. t. 2041.)

A slender species, with long, creeping runners, and a loosely

branched stem, decumbent at the base, or rarely forming dense tufts, and not above 6 inches high. Leaves narrow, the upper ones sheathing the stem to nearly the middle, and often nearly as long. Spikelet solitary, pale-brown, 3 or scarcely 4 lines long, with a few flowers, the 2 or 3 uppermost male, the 2 or 3 lower female, with 3-cleft styles. Fruits narrow and pointed, nearly as long as the whole spikelet, spreading or reflexed when ripe.

In moors and swamps, in northern and Arctic Europe, Asia, and America, and in the higher mountain-ranges of central Europe. Rather frequent in the Highlands of Scotland, more local in northern England, and not recorded from Ireland. *Fl. summer.*



Fig. 1096.

5. Oval Carex. *Carex leporina*, Linn. (Fig. 1097.)

(*C. ovalis*, Eng. Bot. t. 306.)

Stems loosely tufted at the base, forming at length a short, horizontal root-stock, and attaining a foot or more in height. Leaves usually considerably shorter. Spikelets 4 to 6, sessile, distinct, but very close together, ovoid, brownish-green and shining, about 4 lines long, consisting chiefly of female flowers, with a few males at the base of each spikelet. Outer bracts like the glumes, or the lowest rarely with a short, leafy point. Styles 2-cleft. Fruits flat, with a scarious wing or border round the edge.

In moist meadows, and pastures, over the whole of Europe and Russian Asia, except perhaps the extreme north and south. Generally diffused over Britain. *Fl. summer, rather early.*



Fig. 1097.

6. Hare's-foot Carex. *Carex lagopina*, Wahlenb.
(Fig. 1098.)

(*C. leporina*, Eng. Bot. Suppl. t. 2815.)



Fig. 1098.

Very near the *oval C.*, but a smaller plant, seldom above 8 or 9 inches high, forming rather dense tufts, with the leaves about half the height of the stems. Spikelets usually 3 or 4, very close together, of the shape of those of the *oval C.* but rather smaller, and the fruits, although flat, are not winged as in that species.

An alpine plant, not unfrequent in northern Europe and Asia, at high latitudes, and in the higher mountain-ranges of central and southern Europe. In Britain, only in a few localities in the Scotch Highlands, near Aberdeen. *Fl. summer.*

7. Elongated Carex. *Carex elongata*, Linn. (Fig. 1099.)
(Eng. Bot. t. 1920.)



Fig. 1099.

When first flowering this plant has the appearance of tall, luxuriant specimens of the *whitish C.*, often attaining 2 feet, but the spikelets are browner, and the ripe fruit attains near 2 lines, tapers into a point, and spreads more or less from the axis, projecting far beyond the glumes. The spikelets are longer, narrower, and not near so close as in the *oval C.*, and the fruits are not at all winged.

In marshes, in central and northern Europe and northern Asia, from northern Spain and Italy almost to the Arctic Circle. Rare in Britain, although it has been found in several counties, both of England and Ireland. *Fl. early summer.*

8. Star-headed Carex. *Carex stellulata*, Gooden.
(Fig. 1100.)

(Eng. Bot. t. 806.)

A tufted species, rarely above 6 or 8 inches high, with the leaves mostly shorter than the stem. Spikelets 3 or 4, at some distance from each other (except sometimes the 2 uppermost), oval-oblong, and about 3 lines long when they first come out; but as the flowering advances, the long-beaked fruits spread in every direction, giving the spikelets a nearly globular form. The male flowers occupy the lower half of the terminal spikelet, and a small portion of the base of the two others. Styles 2-cleft. Fruit about 2 lines long, the edges slightly rough.

In marshy places, especially in mountain districts, in Europe and Russian Asia, from Spain and Italy to the Arctic regions, and in North America. Frequent in Britain. *Fl. spring or early summer.*



Fig. 1100.

9. Whitish Carex. *Carex canescens*, Linn. (Fig. 1101.)

(*C. curta*, Eng. Bot. t. 1386.)

Stems tufted, a foot high or rather more, with rather long leaves. Spikelets 4 to 6, at some distance from each other, or the uppermost closer, 3 or 4 lines long, of a pale green. Fruits not longer than the glumes, rounded at top, with a small point, not tapering into a beak as in the last three species. Styles 2-cleft. Male flowers generally very few, at the base of most of the spikelets.

In bogs and marshy places, in northern and Arctic Europe and Asia, and in the mountains of central and southern Europe to the Caucasus, and in North America. Spread over many parts of Britain, and abundant in some bogs, but



Fig. 1101.

not very general. *Fl. early summer.* An alpine variety, with smaller spikelets, has been distinguished under the names of *C. vitilis* or *C. Persoonii*.

10. Remote Carex. *Carex remota*, Linn. (Fig. 1102.)

(Eng. Bot. t. 832.)



Fig. 1102.

Distinguished from all other British species, with mixed spikelets male at the base, by the small pale spikelets at considerable distances from each other, the outer bracts of the 3 or 4 lower ones always very long and leaf-like. Stems slender, a foot high or more. Spikelets smaller than in the *whitish C.* Fruits tapering into a point, but not so long as in the *elongated C.* The terminal spikelet has male flowers in the lower half, the others only a few at the base, and the lowest is often entirely female.

In woods, and moist, shady places, generally dispersed over Europe and central and Russian Asia, except the extreme north. Frequent in England and Ireland, less so in Scotland. *Fl. early summer.*

11. Axillary Carex. *Carex axillaris*, Gooden. (Fig. 1103.)

(Eng. Bot. t. 993, and *C. Bænnighauseniana*, Suppl. t. 2910.)

A rather tall species, with leafy stems often 2 feet high, allied on the one hand to the *remote C.*, but the spikelets are not so distant, and the lowest is either branched, or there are 2 or 3 together, either sessile or very shortly stalked, and only one or two of the lower bracts are leaf-like. On the other hand, the clustered lower spikelets show an approach to the *panicle C.*, and, as in that species, there are a few male flowers at the top of the terminal spikelets; but the inflorescence is much more slender, the spikelets much more distant, and there are usually a few male flowers at the base of most of them. From the

remote-flowered forms of the *prickly C.* it differs in the longer spikelets, the much more leafy lower bract, and the fruit flatter, with very acute edges.

Generally distributed over Europe and Russian Asia, except the extreme north, but not very common. Very local in England and Ireland, and not known in Scotland. *Fl. early summer.*



Fig. 1103.

12. Panicked Carex. *Carex paniculata*, Linn. (Fig. 1104.)
(Eng. Bot. t. 1064.)

A stout species, forming large tufts; the stems attaining from 1 to 3 or even 4 feet in height, and more or less triangular, but never so much so as in the *fox C.*; the leaves in luxuriant specimens longer than the stem, and 3 or 4 lines broad, in poorer specimens much shorter and narrower. Spikelets numerous, brown, crowded into a compound spike or panicle, sometimes 4 or 5 inches long, with the lower branches spreading and an inch long, sometimes contracted into a spike like that of the *fox C.*, but more slender. The individual spikelets are sessile, mostly with a few male flowers at the top, the outer bracts scarious at the edges, the lowest sometimes with short, fine points. Styles 2-cleft. Fruits ovate, beaked, marked on the inner face with several longitudinal ribs or veins.



Fig. 1104.

In marshes and bogs, throughout Europe and Russian Asia, except the extreme north, and in North America. Generally distributed over Britain. *Fl. early summer*. It varies much in the degree of development of the inflorescence, as well as in the nerves or ribs of the fruit. A small variety, distinguished under the name of *C. teretiuscula* (Eng. Bot. t. 1065), has the panicle almost contracted into a spike of about an inch, but much more slender than in the *fox C.*, and the fruit, although the longitudinal ribs are scarcely prominent, is very convex, not flattened as in the latter species. This variety is also connected with the more common state of the *panicled C.* by numerous intermediate forms, often considered as an intermediate species under the name of *C. paradoxa* (Eng. Bot. Suppl. t. 2896.)

13. Fox Carex. *Carex vulpina*, Linn. (Fig. 1105.)

(Eng. Bot. t. 307.)



Fig. 1105.

A stout, tufted plant, 2 to 3 or even 4 feet high, with rather broad but not very long leaves, ending in a fine point, and a sharply-triangular stem, with broader sides than in the *panicled C.* Spikelets numerous, green or pale-brown, densely crowded into a terminal spike of 1 to 2 inches, always more or less compound and interrupted at the base, but the branches never elongated. The outer bracts of the lower clusters of spikelets have a fine leafy point. The individual spikelets are ovoid, many-flowered, all male at the top. Styles 2-cleft. Fruits much flattened, spreading when ripe, with a green or pale-brown rather broad beak.

In marshes and wet meadows, throughout Europe and Russian Asia, except the extreme north, and in North America. Frequent in England and Ireland, more scarce and chiefly a coast plant in Scotland. *Fl. early summer*.

14. Prickly Carex. *Carex muricata*, Linn. (Fig. 1106.)

(Eng. Bot. Suppl. t. 1097.)

A much smaller plant than the two last, seldom attaining a foot

in height, with rather narrow leaves shorter than the stem. Spikelets about 6, rather short, brown or shining green, all mixed, having few male flowers at the top of each, either all simple and crowded in a terminal spike of about an inch, or the lower ones rather more distant and sometimes slightly compound. Outer bracts mostly terminating in short, fine points. Styles usually 2-cleft. Fruits rather large, 2 lines long when ripe, pointed and spreading as in the *star-headed C.*

In marshy and gravelly pastures, throughout Europe and Russian Asia, except the extreme north. Not uncommon in England, Ireland, and southern Scotland. *Fl.* early summer.

The grey *C.* (*C. divulsa*, Eng. Bot. t. 629) appears to be a mere variety of this species, growing in less open situations, with longer stems and leaves, and paler, more distant spikelets, forming an interrupted spike of 2 or 3 inches; the lowest spikelet occasionally compound, with a rather long, leafy outer bract. It is then distinguished from the *elongated S.* by the shorter nearly globular spikelets without any male flowers at the base, and the fruits much less flattened.



Fig. 1106.

15. Sand Carex. *Carex arenaria*, Linn. (Fig. 1107.)

(Eng. Bot. t. 928.)

Rootstock creeping in the sand often to the length of many feet, emitting small tufts or single stems from a few inches to 1 or 1½ feet in height and leafy at the base. Spikelets rather large, ovoid, all simple and sessile, crowded 8 or 10 together in a terminal spike of 1 to 2 inches, or 1 or 2 lower ones occasionally more distant. Outer bracts all glume-like, or the lowest with leafy points. Male flowers often numerous in the upper, and especially in the intermediate spikes, very few at the top of the lowest. Fruits much flattened, tapering into a beak, and winged as in the *oval C.*, from which this species differs in the creeping rootstock and in the male flowers at the top, not at the base of the spikelets.

In maritime sands, on the coasts of Europe, western Asia, and North America. Abundant all round Britain. *Fl.* all summer.



Fig. 1107.

The *intermediate* *C.* (*C. intermedia*, Eng. Bot. t. 2042, *C. disticha*, Bab. Man.) appears to be merely an inland variety, not uncommon in marshy ground and wet meadows, in Europe and Russian Asia, and occurring in various parts of England, Ireland, and southern Scotland. It is usually taller and more slender and leafy, and the fruits are generally, but not always, longer and less distinctly winged.

16. Divided Carex. *Carex divisa*, Huds. (Fig. 1108.)

(Eng. Bot. t. 1096.)



Fig. 1108.

Rootstock creeping, hard, and almost woody; the stems usually short, but always more slender than in the *sand* *C.* Spikelets few and short, crowded into an ovoid or oblong spike or head, seldom above half an inch long, all, especially the upper ones, with several male flowers at the top. Styles 2-cleft. Fruits scarcely flattened, not winged, varying much in the length of their beak.

Chiefly a seacoast plant, but found occasionally inland, in marshes and swamps, in southern Europe, extending eastward to the Caucasus and Himalaya, and up the western coasts to the British Channel. In Britain, frequent on some of the eastern and southern coasts of

England and Ireland, but scarcely extending to the north of England.
Fl. early summer.

17. Curved Carex. *Carex incurva*, Lightf. (Fig. 1109.)

(Eng. Bot. t. 927.)

Rootstock creeping; the stems not above 2 or three inches high, often curved as well as the rush-like leaves, which are usually about the same length. Spikelets 3 or 4, closely packed into a broadly ovoid, brown head, each with a few male flowers at the top. Styles 2-cleft. Fruits broad, rather inflated, tapering into a short beak projecting beyond the glumes.

A northern, chiefly Arctic species, in Europe and Russian Asia, and perhaps also in the Alps of central Europe and Asia, but there generally replaced by a closely allied species with a 3-cleft style. In Britain, only on the sandy sea-shores of northern Scotland. *Fl. summer.*



Fig. 1109.

18. Russet Carex. *Carex saxatilis*, Linn. (Fig. 1110.)(*C. pulla*, Eng. Bot. t. 2045, and *C. Grahmi*, Suppl. t. 2923.)

Rootstock creeping; the scaly runners ending in tufts of leaves. Stems usually shortly decumbent at the base, 8 inches to a foot high or rather more, and leafy. Spikelets about 3 or 4, distant from each other; the terminal one or two cylindrical and small; the lower 3, 2, or 1 female, ovoid, of a dark brown, about 6 or 8 lines long; the lowest on a slender stalk, with a leafy bract at its base. Style 2-cleft. Fruit ovoid, inflated, longer than the glume, with a very short point or beak.

Limited to the Arctic and high northern regions of Europe. In Britain, only in the higher Scotch mountains. *Fl. summer.*



Fig. 1110.

19. Tufted *Carex*. *Carex cæspitosa*, Linn. (Fig. 1111.)(Eng. Bot. t. 1507. *C. vulgaris*, Brit. Fl.)

Fig. 1111.

A very variable species, but (with the following, *acute C.*) readily known among all the British species with distinct male and female spikelets, by the 2-cleft styles and almost flat fruits. The root-stock has creeping runners, but the stems are often densely tufted, enclosed at the base by the brown sheaths of the leaves, the outer ones often without blades and worn into ragged fibres. In dry soils the stems are scarcely 6 inches high, and the leaves still shorter; in rich swamps the stems attain 4 feet, with the leaves almost as long. Spikelets 3 to 6, each from $\frac{1}{2}$ to $1\frac{1}{2}$ inches long; the terminal one and the upper portion or the whole of the next male, the remainder female; the lowest usually shortly stalked, and 1 or 2 of the outer bracts leafy. Glumes dark-brown or

black, often with a green midrib.

In pastures, meadows, and marshes. Common in Europe and Russian Asia, from the Mediterranean to the Arctic regions, and in North America. *Fl. spring and summer.* The principal forms occurring in Britain, often considered as species, are:—

a. *Rigid tufted C.* (*C. rigida*, Eng. Bot. t. 2047.) A dwarf alpine form, scarcely 6 inches high, with short, flat, and rigid leaves. In exposed situations, at great elevations, or at high northern latitudes.

b. *Common tufted C.* Usually 1 to 3 feet high, loosely tufted, with narrow leaves, including many intermediate forms passing gradually into the preceding and following varieties.

c. *Densely-tufted C.* (*C. stricta*, Eng. Bot. t. 914.) Usually about 2 feet high, more glaucous and tufted than the last variety, with narrow leaves, rather long spikelets, the fruits more distinctly arranged in 8 or 9 rows, and their nerves more strongly marked. Equally common with the last variety, but usually in more open situations.

d. *Water tufted C.* (*C. aquatilis*, Eng. Bot. Suppl. t. 2758.) A very tall, leafy form, with slender spikelets, approaching the *acute C.* In very wet, rich situations; not common in Britain, but said to occur in the Scotch Highlands.

20. **Acute Carex.** *Carex acuta*, Linn. (Fig. 1112.)

(Eng. Bot. t. 580. *C. Gibsoni*, Bab. Man.?)

This may again be a mere luxuriant variety of the *tufted C.* It attains 2 or 3 feet, with long, flaccid leaves, and leafy bracts; the female spikelets are often 3 inches long or more; the glumes all narrow and acute, and the fruits themselves narrower than in most varieties of the *tufted C.*

In wet meadows, and marshes, generally distributed over the area of the *tufted C.*, and not uncommon in Britain. *Fl. spring and early summer.*



Fig. 1112.

21. **Alpine Carex.** *Carex alpina*, Sw. (Fig. 1113.)

(*C. Vahlii*, Eng. Bot. Suppl. t. 2666.)

A rather slender species, 6 inches to a foot high, tufted or shortly creeping, with short leaves. Spikelets about 3, ovoid, black or dark-brown; the terminal one mixed, hairy, a few male flowers at its base; the 2 others female, one close to the terminal one, the other a little lower down, on a short stalk, in the axil of a leafy bract. Styles 3-cleft. Fruit green, obtusely triangular, shortly beaked, and projecting beyond the glume.

On mountain-rocks, in northern Europe and Asia, at high latitudes. In Britain, only in two localities in the Clova mountains of Scotland. *Fl. summer.*



Fig. 1113.

22. Buxbaum's Carex. *Carex Buxbaumii*, Wahlenb.

(Fig. 1114.)

(Eng. Bot. Suppl. t. 2885. *C. canescens*, Brit. Fl.)

Fig. 1114.

Rootstock shortly creeping, but the stems often densely tufted, 1 to 2 feet high, with rather long leaves. Spikelets usually 4, in a loose spike, the terminal one male at the base, the others all female and sessile, or the lowest on a very short stalk. Lowest bract, and sometimes the next also, leafy. Glumes dark-brown, mostly pointed. Styles 3-cleft. Fruits of a pale colour, much resembling those of the *tufted C.*, usually as long as or longer than the glumes, rather obtusely angled, and not beaked.

In bogs, in northern and Arctic Europe, and Russian Asia, and North America, and in the mountains of central Europe. In Britain, only known from an island in Lough Neagh, in Ireland. *Fl. July.*

23. Black Carex. *Carex atrata*, Linn. (Fig. 1115.)

(Eng. Bot. t. 2044.)



Fig. 1115.

Stems loosely tufted, $\frac{1}{2}$ to $1\frac{1}{2}$ feet high; the leaves broad and flaccid, with loose sheaths. Spikelets 3 or 4, black or dark-brown, cylindrical, 8 or 9 lines long; the terminal one with a few male flowers at the base, or irregularly mixed, not all male as in the Arctic *C. ustulata*, which closely resembles this species in other respects; the other spikes entirely female or nearly so, stalked, erect when young, drooping when ripe. Outer bract leafy. Glumes rather large, pointed. Styles 3-cleft. Fruits dark and shining, flat when young, very acutely triangular when ripe, with a short point or beak.

A common alpine species, in northern and Arctic Europe, Asia, and North America, and in the great mountain-ranges of central Europe and Asia. Not

unfrequent in some of the Scotch Highlands, and found also, but sparingly, on Snowdon in North Wales, but not in Ireland. *Fl. summer, rather early.*

24. Dwarf Carex. *Carex humilis*, Leyss. (Fig. 1116.)

(*C. clandestina*, Eng. Bot. t. 2124.)

Tufts short and very dense, with narrow, radical leaves, broadly sheathing at their base, and considerably longer than the flower-stems. These are from 3 to 5 inches high, with a terminal male spikelet about 9 lines long, and 3 or 4 much smaller female ones, placed at intervals along the stem almost from its base, and, although stalked, scarcely protruding from the white, scarious sheaths of the leafless bracts; the glumes of both the male and female spikelets are also scarious on the edges. Styles long and 3-cleft. Fruits ovoid, obtuse, more or less ribbed, and slightly downy.



Fig. 1116.

On downs and stony wastes, chiefly in limestone districts, in central and southern Europe, extending eastward far into south Russian Asia, and northwards into most of the calcareous districts of France and Germany. In Britain, only in Wilts, Somerset, Gloucester, and Hereford counties. *Fl. spring.*

25. Fingered Carex. *Carex digitata*, Linn. (Fig. 1117.)

(Eng. Bot. t. 615.)

A densely tufted species, 6 inches to a foot high, with short leaves. Male spike about 6 lines long, and really terminal although exceeded by the upper female spike, which is placed close under it; there are also 2 or 3 other female ones rather lower down, all shortly stalked, longer than the male and more or less spreading, so as to give the whole spike a digitate appearance; the flowers in each spikelet at some distance from each other. Bracts brown and sheathing, without leafy



Fig. 1117.

points or only a very short one. Styles 3-cleft. Fruits obovoid and minutely downy.

In the woods of limestone mountains, in central and southern Europe and temperate Russian Asia, extending northward into Scandinavia. Rare in Britain, and only in the hilly districts of western and north-central England. *Fl. spring.*

26. Vernal Carex. *Carex præcox*, Jacq. (Fig. 1118.)

(Eng. Bot. t. 1099.)



Fig. 1118.

Near the *pill-headed C.* and the *downy C.*, but with shorter, stiffer leaves; the inflorescence is less compact than in the former, more so than in the latter, and the bract of the lowest spikelet forms a short sheath with a small leafy point. The male spikelet is larger, and the glumes more obtuse, but with a distinct fine point. Fruits rather small, shortly beaked, covered with a minute down.

In dry pastures, and heaths, common in Europe and Russian Asia, except the extreme north, and naturalized in North America. Generally distributed over Britain. *Fl. spring.*

27. Mountain Carex. *Carex montana*, Linn. (Fig. 1119.)

(Eng. Bot. Suppl. t. 2924. *C. collina*, Brit. Fl.)

Very near the *pill-headed C.*, but the bracts have scarcely any leafy

points; the female spikelets are shorter, with much darker glumes; and the fruits are twice as long, with acute angles, and are rather hairy than downy.

In pastures and heaths, with the *vernal C.*, in central and southern Europe and western Asia, and extending northward into Scandinavia. In Britain, said to have been found in Sussex, and near Chepstow, in Monmouthshire. *Fl. spring.*

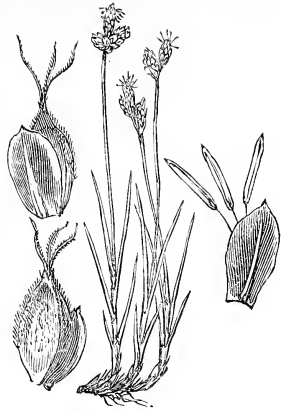


Fig. 1119.

28. Pill-headed Carex. *Carex pilulifera*, Linn. (Fig. 1120.)

(Eng. Bot. t. 885.)

Stems 6 inches to a foot high, forming broad and sometimes loose tufts, but scarcely creeping at the base. Leaves shorter than the stem, weak and flexible. Female spikelets 2 or 3, short and compact, close under the terminal male one. Bracts leafy, usually short, without sheaths. Glumes brown, more or less pointed. Styles 3-cleft. Fruits small, obovoid or nearly globular, scarcely beaked, covered with a minute down.

In hilly pastures, and moors, generally distributed over Europe, and the same, or a closely allied species, across Russian Asia and in North America. Common in Britain. *Fl. early summer.*



Fig. 1120.

29. Downy Carex. *Carex tomentosa*, Linn. (Fig. 1121.)

(Eng. Bot. t. 2046.)

Rootstock creeping. Stems erect, slender, a foot high or more. Leaves narrow, erect, much shorter than the stem. Terminal male



Fig. 1121.

spikelet about an inch long; females 1 or 2, at some distance from it, oblong, erect, and nearly sessile, rather more than $\frac{1}{2}$ inch long, compact, with small brown glumes. Lower bract leafy, without any sheath. Styles 3-cleft. Fruits small, ovoid or nearly globular, not beaked, downy. In moist meadows, in central and southern Europe, extending eastward to the Caucasus, and northward to the Baltic. In Britain, only known from a single locality near Merton, in Wiltshire. *Fl. early summer.*

30. Slender Carex. *Carex filiformis*, Linn. (Fig. 1122.)

(Eng. Bot. t. 904.)



Fig. 1122.

The habit is near that of the *distant C.* or of the *long-bracted C.*, but it differs in its downy fruits. Rootstock creeping. Stems 1 to 2 feet high, with long, narrow leaves; the leafy bracts are also long and narrow, almost as in the *long-bracted C.*, but without or almost without sheaths. Male spikelets usually 2 or even 3, the terminal one often $1\frac{1}{2}$ inches long; females 1 or 2, remote from them, nearly sessile, 6 to 9 lines long. Styles 3-cleft. Fruits near 2 lines long, ovoid, shortly beaked, and very downy.

In wet ditches, and marshes, in northern and central Europe, and Russian Asia, from the Arctic regions to central France and the Alps, and in North America. Not common in Britain, occurring chiefly in Scotland, northern

England, and Ireland. *Fl. spring.*

31. **Hairy Carex.** *Carex hirta*, Linn. (Fig. 1123.)

(Eng. Bot. t. 685.)

Rootstock creeping. Stems weak, leafy, 1 to 2 feet high, and, as well as the leaves, more or less hairy. Lower bracts long and leafy, with long sheaths. Terminal male spikes 1 or 2. Females very distant, cylindrical, rather loose, an inch long or more, much like those of the *wood C.*, and the fruits, as in that species, taper into a long beak, but they are always covered with short, spreading hairs.

In woods and wet pastures, common in Europe and Russian Asia, except the extreme north. Frequent also in Britain, excepting the north of Scotland. *Fl.* spring and early summer.



Fig. 1123.

32. **Pale Carex.** *Carex pallescens*, Linn. (Fig. 1124.)

(Eng. Bot. t. 2185, *not good*.)

The general aspect and pale yellowish-green fruiting spikelets are like those of the *yellow C.*, but the fruits are obtuse, without any prominent beak. Stems tufted, leafy at the base, seldom above a foot high. Terminal spikelet male, light-brown, about 6 lines long. Female spikelets 2 or rarely 3, shortly stalked, erect or slightly drooping, oblong, shorter than the male one, and all at short distances below it. Bracts leafy, with a short, sheathing base, or the lowest scarcely sheathing. Styles 3-cleft. Fruits glabrous, obtuse.

In marshy places, extending over Europe and Russian Asia, from the Mediterranean to the Arctic regions, and often very common, and in North Ame-



Fig. 1124.

rica. Said to be frequent in Scotland and Ireland, but certainly less so in England. *Fl. early summer.*

33. Long-bracted Carex. *Carex extensa*, Gooden. (Fig. 1125.)

(Eng. Bot. t. 833.)



Fig. 1125.

A tufted, rather slender species, 1 to 2 feet high, with narrow, often convolute, stiff and erect leaves. Spikelets nearly sessile, and near together at the top of the stem, or only the lower one distant, as in the *yellow C.*, but all oblong and of a brown-green, as in the *distant C.*, although usually not so long, and differing from both in the long, narrow, leafy bracts, the lowest usually much exceeding the stem. Styles 3-cleft. Fruits as in the *distant C.*, ovoid, triangular, strongly nerved, and tapering into a conical beak.

A seacoast plant, very common round the Mediterranean, and extending up the western coasts of Europe to the Baltic. It is general also round the British Isles. *Fl. early summer.*

34. Yellow Carex. *Carex flava*, Linn. (Fig. 1126.)

(Eng. Bot. t. 1294, and *C. Ederi*, t. 1773.)

Usually densely tufted and leafy, seldom attaining a foot in height, and acquiring frequently a yellowish hue, especially the fruiting spikelets. Leaves flat. Male terminal spikelet 6 to 9 lines long. Females 1, 2, or 3, sessile or shortly stalked and very near the male, and often 1 much lower down on a longer stalk; all erect, ovoid or oblong, or when ripe nearly globular. Bracts all leafy and sheathing at the base. Styles 3-cleft. Fruits ovoid, distinctly nerved, with a prominent beak, always very spreading or reflexed.

In turfy bogs and marshy pastures, very common in Europe and Russian Asia, from the Mediterranean to the Arctic regions, and in

North America. Generally diffused over Britain. *Fl. spring and summer.* It varies much in the distance of the lower spikelets from the upper ones, and in the size of the fruits; but the small-fruited forms with short beaks, often distinguished under the name of *C. Oederi*, are very inconstant in their characters.



Fig. 1126.

35. Distant Carex. *Carex distans*, Linn. (Fig. 1127.)

(Eng. Bot. t. 1234.)

Stems more or less tufted, slender, 1 to 2 feet high, with flat but rather narrow leaves, much shorter than the stem. Spikelets few and far apart; the terminal one male (sometimes with a small one close under it), the others female, oblong-cylindrical, $\frac{1}{2}$ to 1 inch long, stalked, but often appearing sessile from the stalks being enclosed in the long sheaths of the leafy bracts. Glumes brown. Styles 3-cleft. Fruits usually rather dark-green, but sometimes yellowish, erect, rather strongly nerved or ribbed, tapering into a rather long beak.

In marshes and wet moors, or sometimes in dryer pastures, especially near the sea, in Europe and western Asia, from the Mediterranean to Scandinavia, and in North America, although not an Arctic plant. Common in Britain. *Fl.*

summer. It varies much in the length of the stalks of the lower spikelets and in the prominence of the ribs of the fruit. The following are the principal varieties, which are often considered as species:—



Fig. 1127.

a. *Tawny distant C.* (*C. fulva*, Eng. Bot. t. 1295, and *C. speirostachya*, Suppl. t. 2770), with short, pale-coloured spikelets, and a rather long beak to the fruit.

b. *Starred distant C.* (*C. depauperata*, Eng. Bot. t. 1098), with only 4 or 5 fruits to the spikelet, but each one larger, somewhat inflated, with a very long beak.

c. *Two-nerved distant C.* (*C. binervis*, Eng. Bot. t. 1235), with darker spikelets and more angular fruits.

d. *Smooth distant C.* (*C. laevigata*, Eng. Bot. t. 1387), like the last, but the slender green spikelets often 1 to 1½ inches long, much like those of the *wood C.*, but erect, not drooping.

36. Dotted Carex. *Carex punctata*, Good. (Fig. 1128.)



Fig. 1128.

Very much like the common seacoast form of the *distant C.*, of which it may be a mere variety; but the fruits appear to be entirely without longitudinal ribs, except the 3 angles, which are slightly prominent.

Indicated here and there in various parts of the area of the *distant C.*, and has been found in two or three localities on the west coast of England, and in Ireland. *Fl. summer.*

37. Carnation Carex. *Carex panicea*, Linn. (Fig. 1129.)

(Eng. Bot. t. 1505. *Carnation-grass.*)

Stems tufted, but emitting creeping runners from the base, 1 to 1½ feet high, with rather short, erect, flat leaves, more or less glaucous. Spikelets usually 3, the terminal one male, the others female, distant, erect, stalked, cylindrical, ½ to 1 inch long, often loosely imbricated; the flowers, especially in the lowest one, at some distance from each other. Bracts shortly leafy, with rather long sheaths. Glumes brown. Styles 3-cleft. Fruits ovoid, without ribs except the 3 angles, obtuse, with a very short beak or point, like those of the *glaucous C.*, from which plant this species differs chiefly in the more erect, loose female spikelets, and in the male spikelet always solitary.

In meadows and moist pastures, one of the commonest species throughout Europe and Russian Asia, occurring also in North America. Common in Britain. *Fl. early summer*. An alpine variety, not uncommon in high northern latitudes, and at considerable elevations in the mountains of central Europe, with the sheaths of the bracts looser, the spikelets darker-coloured and few-flowered, and the fruits more decidedly tapering into a beak, has been distinguished as a species, under the name of *C. vaginata* (*C. Mielichhoferi*, Eng. Bot. t. 2293, *C. phæostachya*, Suppl. t. 2731). It occurs in some of the Highlands of Scotland.



Fig. 1129.

38. Capillary Carex. *Carex capillaris*, Linn. (Fig. 1130.)
(Eng. Bot. t. 2069.)

Stems slender, densely tufted, without creeping runners, 3 or 4 to 8 or 9 inches high, longer than the leaves. Terminal spikelets male, and small. Female spikelets 2 or 3, much lower down, but on long, thread-like peduncles, so as sometimes to exceed the male, of a rather pale colour, loose-flowered, but seldom 6 lines long. Bracts shortly leafy, the lower one with a rather long sheath. Glumes very scarious on the edges. Styles 3-cleft. Fruits 10 or 12 in each spikelet, tapering into a pointed beak.

In alpine meadows, and on moist rocks, in northern and Arctic Europe and Asia, in the high ranges of central and southern Europe to the Caucasus, and in North America. Frequent in the Scotch Highlands. *Fl. summer*.



Fig. 1130.

39. Mud Carex. *Carex limosa*, Linn. (Fig. 1131.)

(Eng. Bot. t. 2043, and *C. irrigua*, Suppl. t. 2895.)

Rootstock creeping. Stem slender, from 3 inches to a foot high,

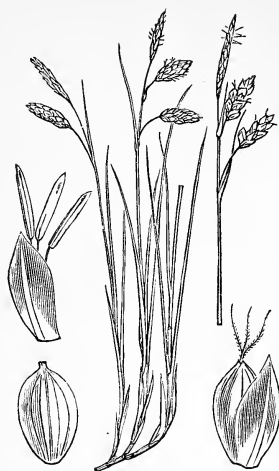


Fig. 1131.

with narrow leaves, sometimes as long as the stem, sometimes much shorter. Terminal male spikelet $\frac{1}{2}$ to near 1 inch long. Females 1 or 2, on slender stalks, drooping, rather loose, 6 to 8 lines long. Bracts leafy, without sheaths, or with a short, scarious one. Glumes rather dark-brown, ovate, the upper ones pointed. Styles 3-cleft. Fruits rather large, roundish, compressed, scarcely pointed, and not distinctly beaked.

In bogs and mountain marshes, in northern and Arctic Europe, Russian Asia, and North America, and in the higher ranges of central Europe. In Britain, chiefly in Scotland, Ireland, and northern England. *Fl.* summer. The *C. rariflora* (Eng. Bot. t. 2516) is a high northern or Arctic variety, with the glumes almost black, and more obtuse,

and only 5 or 6 fruits in each spikelet. It occurs, but rarely, in the Scotch Highlands.

40. Glaucous Carex. *Carex glauca*, Scop. (Fig. 1132.)
(*C. recurva*, Eng. Bot. t. 1506, *C. Michelliana*, t. 2236, and *C. stictocarpa*, Suppl. t. 2772.)



Fig. 1132.

The creeping rootstock, glaucous foliage, and most of the characters, are those of the *carnation C.*, but there are generally 2 or 3 male spikelets, the female ones are rather more compact, on longer stalks, and more or less drooping when ripe, except in very dry situations, and the sheaths of the leafy bracts are usually shorter. Stems, in dry situations, 6 or 8 inches high, with short, curved leaves; in rich meadows, 1 to $1\frac{1}{2}$ feet, with erect leaves as long as the stems. Female spikelets 2 or 3, varying from $\frac{1}{2}$ to above 1 inch in length. Glumes dark-brown. Styles 3-cleft. Fruits ovoid, not ribbed except the 3 obtuse angles, and without any beak.

In meadows and marshes, in central and southern Europe, extending eastward to the Caucasus, and northward far into Scandinavia, and in

North America. Abundant in Britain generally, although in the north less so than the *carnation C.* *Fl.* early summer.

41. Wood Carex. *Carex sylvatica*, Huds. (Fig. 1133.)
(Eng. Bot. t. 995.)

Stems weak, tufted, leafy, 1 to 2 feet high. Leaves and leafy bracts flaccid, the latter with long sheaths. Terminal spikelet male, about an inch long. Lower spikelets 2 to 4, or rarely more, all female or occasionally one or two of the upper ones partially or even wholly male, the females distant, cylindrical, loose-flowered, about an inch or rather longer, on slender stalks, and at length more or less drooping. Glumes green, narrow, and very pointed. Styles 3-cleft. Fruit glabrous, ribbed, tapering into a long beak.

In woods, common in Europe and Russian Asia, except the extreme north, although in the south it is rather a mountain plant. Frequent in Britain, except the north of Scotland. *Fl.* early summer.



Fig. 1133.

42. Thin-spiked Carex. *Carex strigosa*, Huds. (Fig. 1134.)
(Eng. Bot. t. 994.)

Very near the *wood C.*, but the female spikelets are much longer, and more slender, usually above 2 inches long, the flowers at some distance from each other, the peduncles much shorter, almost concealed in the long sheaths of the bracts. Glumes green and lanceolate. Fruits tapering to a point, but not into a long beak as in the *wood C.*

In mountain woods, dispersed over central Europe; extending from France and Denmark to the Caucasus, but nowhere very common. Occurs in many parts of England and Ireland, but not in Scotland. *Fl.* early summer. It is probable that varieties of the *wood C.* are often mistaken for it.



Fig. 1134.

43. **Cyperus-like Carex.** *Carex Pseudocyperus*, Linn.
(Fig. 1135.)

(Eng. Bot. t. 242.)



Fig. 1135.

Stems tall, stout, and triangular, with long, broad leaves, as in the *pendulous* *C.*, but the spikelets are not above 2 inches long, more crowded at the top of the stem, on longer stalks, and remarkable for the very narrow, pointed, green glumes, and the narrow, striated, spreading fruits, ending in a long pointed, slender beak. The spikelets droop when in fruit, as in the *pendulous* *C.* The terminal male one has often a few female flowers at the top, or sometimes in the whole upper half. Styles 3-cleft.

In marshes and wet ditches, in central and southern Europe, extending eastward to the Caucasus, and northward into southern Scandinavia, and in North America. Spread over a great part of England and Ireland, but not very common, and rare in Scotland, if really found there at all. *Fl. early summer.*

44. **Pendulous Carex.** *Carex pendula*, Huds. (Fig. 1136.)
(Eng. Bot. t. 2315.)



Fig. 1136.

One of the largest of our *Carexes*. Stems stout, triangular, leafy, 3 to 5 feet high. Leaves long, and often near $\frac{1}{2}$ inch broad. Spikelets 4 to 6 inches long, more or less drooping, the terminal one male; females 3 or 4, at some distance from the male, their stalks almost concealed in the sheaths of the long, leafy bracts. Glumes ovate-lanceolate, brown, with a green centre. Styles 3-cleft. Fruits small, crowded, ovoid, with a very short beak.

In woods and shady places, in central and southern Europe, extending eastward to the Caucasus and northward to the Channel, but scarcely into northern Germany. In Britain, scattered over England, Ireland, and southern Scotland. *Fl. early summer.*

45. **Bottle Carex.** *Carex ampullacea*, Gooden. (Fig. 1137.)

(Eng. Bot. t. 780.)

A stout, tufted species, the stems scarcely angled, 1 to 3 feet high, with long leaves. Spikelets 1 to 2 inches long or even more; males 2 or 3, the terminal one longer than the others; females 2 or 3, erect, cylindrical, compact, the lowest shortly stalked. Leafy bracts rather long, without sheaths. Styles 3-cleft. Fruits ovoid, inflated, pointed, with a rather long beak, spreading horizontally.

In bogs and marshes, in central and northern Europe, and central and Russian Asia, from northern Spain and Italy to the Arctic regions, and in North America. Generally spread over Britain. *Fl.* early summer.



Fig. 1137.

46. **Bladder Carex.** *Carex vesicaria*, Linn. (Fig. 1138.)

(Eng. Bot. t. 779.)

Very near the *bottle C.*, but the stem is more angular, the spikelets rather shorter, and the fruits, although inflated as in that species, are more conical, tapering more gradually into the beak.

The geographical distribution is nearly the same as that of the *bottle C.*, extending from Spain to the Arctic regions, and all across Russian Asia into North America. In Britain, however, it is less frequent, and does not extend so far north. *Fl.* spring and early summer.



Fig. 1138.

47. Marsh Carex. *Carex paludosa*, Gooden. (Fig. 1139.)

(Eng. Bot. t. 807.)



Fig. 1139.

A stout, long-leaved species, with a creeping rootstock and triangular stems, 2 to 3 feet high. Male spikelets 2 or 3, above an inch long, and sessile. Female spikelets 2 or 3, rather distant, cylindrical, often 2 inches long, sessile, or the lowest shortly stalked. Bracts leafy, without sheaths. Glumes more or less pointed. Styles 3-cleft. Fruits ovate, slightly 3-angled, but much flattened, tapering into a very short, spreading point or beak.

In wet meadows, and marshes, throughout Europe and central and Russian Asia, except the extreme north. Frequent in England, Ireland, and southern Scotland, less so in the north. *Fl. spring and early summer.* A taller variety, with longer female spikelets, on longer

stalks, the glumes more pointed, and the beak to the fruit more distinct, has been distinguished as a species under the name of *C. riparia* (Eng. Bot. t. 579). It is also said to have the minute point on the anthers more distinct: but all these characters appears to be too variable to be relied upon as specific. It grows with the smaller form, and is rather more frequent in Britain.

LXXXVII. THE GRASS FAMILY. GRAMINEÆ.

Herbs, with stems usually hollow, except at the nodes, and alternate, narrow, parallel-veined, entire leaves, sheathing the stem at their base, but the sheaths are usually split open on the side opposite to the blade, and terminate, within the base of the blade, in a small scarious appendage called a *ligule*. Flowers in *spikelets*, arranged in terminal spikes, racemes, or panicles. Each spikelet consists usually of 3 or more chaff-like, concave scales or bracts, called *glumes*, arranged alternately on opposite sides of the spikelet, their concave faces towards the axis; the 2 lowest or first and second glumes usually empty, nearly opposite to each other,

and often differently-shaped from the others. The succeeding, or *flowering glumes*, enclose each a rather smaller scale called a *palea*, usually thinner, and with 2 longitudinal ribs or veins, placed either between the glume and the axis of the spikelet, with its back to the axis, or apparently opposite the glume at the end of the axis. Where there are more than three glumes, the third or lowest flowering glume is usually close to the second, its flower is sometimes imperfect, or it is even quite empty, and it is often intermediate in shape between the outer empty ones and the succeeding flowering ones, which are inserted on the axis at distinct intervals. Within the palea, or apparently between the flowering glume and the palea, is the real flower, consisting usually of 2 minute, almost microscopical scales called *lodicules*, of 3 (rarely 2 or 6) stamens, and of a 1-celled, 1-ovuled ovary, crowned by 2 more or less feathery styles. The name of *flower*, however, is here, as in other works, generally meant to include the flowering glume and palea. Fruit 1-seeded and seed-like, called a *grain* or *caryopsis*, consisting of the real seed and pericarp, either free or adhering to the persistent *palea*, or enclosed in the more or less hardened flowering glume and palea, or in the outer glumes. Embryo small, at the base of a mealy albumen.

Such is the general plan upon which the flowers of Grasses are arranged, but there are many variations which require to be carefully attended to in discriminating the genera of this most natural, but somewhat difficult family. Where the spikelet contains but one flower, its flowering glume and inner palea appear often almost opposite to each other, like an inner pair of glumes within the outer empty ones. Sometimes there are three or even more outer, empty glumes, either passing gradually into the shape of the flowering ones, or one or two, very differently shaped (usually much smaller), are placed between the outer empty pair and the flowering one; or the axis of the spikelet terminates in one or more rudimentary, empty glumes. Occasionally one flower, either below or above the perfect one, has stamens only, and some exotic species are always monœcious or diœcious. Frequently the midrib of the flowering glumes alone, or of the intermediate empty ones alone, or of all the glumes, is prolonged into a bristle, sometimes very long, called an *awn*, and this awn is either terminal, proceeding from the point of the glume or from a notch at the top, or is inserted lower down, on its back, or at its very base. Sometimes the whole spikelet contains only two glumes, one empty, the other flowering, with or even without a palea, or is reduced to a single flowering

ing glume and palea. Many botanists restrict the name of *glume* to the outer empty pair, calling both the flowering glumes and their palea, *paleas* or *glumellas*, and giving the name of *sterile florets* to all other empty glumes in the spikelet, or even to a small prolongation of the axis which is often observable at the outer base of the palea of the terminal flowers. The leaves of *Grasses* are frequently described as *convolute*, that is, rolled inwards on the edges, but this character is often very deceptive in dried specimens, for in many species the leaves are perfectly flat when growing, but roll inwards in drying immediately on being gathered.

Grasses are abundantly diffused over the whole world, from the utmost limits of phænogamous vegetation towards the Poles or on alpine summits, to the burning plains of the Equator. In temperate regions they form the principal mass of the green carpeting of the soil, whilst in tropical regions some species (the *Bamboos*) attain the height of tall trees. They supply us with one of the most important articles of food for man, in the shape of grain, and for cattle as constituting the chief portion of meadows and pastures.

- | | | |
|---|--|----|
| 1 | { Spikelets 1-flowered | 2 |
| | { Spikelets containing 2 or more flowers | 24 |
| | { Spikelets arranged along one side of a slender, simple, linear spike . . | 3 |
| | { Spikelets arranged along one side of the simple linear branches of the | |
| | panicle | 5 |
| 2 | { Spikelets arranged in a close, cylindrical or ovate spike or spike-like | |
| | panicle | 7 |
| | { Spikelets arranged in a loose, branching panicle | 16 |

Spikelets 1-flowered, in one-sided linear spikes.

- | | | |
|---|--|-------------------|
| 3 | { Glume 1 only, ending in a fine point, and enclosing the palea and flower | 24. NARD. |
| | { Two outer empty glumes and a flowering one | 4 |
| | { Outer glumes 1 line long, thin and obtuse. Axis not jointed. | 10. CHAMAGROSTIS. |
| 4 | { Outer glumes 2 lines long, stiff, and strongly ribbed. Axis jointed. | 23. LEPTURUS. |
| 5 | { Spikelets in pairs or clusters along the branches | 3. PANICUM. |
| | { Spikelets single along the branches | 6 |
| | { Spikelets half an inch long, laterally flattened. Glumes all strongly | |
| 6 | { keeled, erect | 22. SPARTINA. |
| | { Spikelets about a line long. Outer glumes spreading | 21. CYNODON. |

Spikelets 1-flowered, in a dense spike or spike-like panicle.

- | | | |
|---|--|----|
| 7 | { Outer glumes without awns. Flowering glumes with or without awns | 8 |
| | { All the glumes awned | 13 |

- 8 { Only 2 nearly equal empty glumes enclosing the flower 9
 { An additional small empty glume outside the 2 equal ones 3. PANICUM.
 { Two additional small, awned, empty glumes, withinside the 2 equal
 ones 5. ANTHOXANTH.
- 9 { Outer glumes swollen and shining at the base. Spikelets rather small.
 14. NITGRASS.
- 10 { Outer glumes keeled or boat-shaped 10
 { A tuft of hairs at the base of the flower, within the outer glumes. Reed-
 like grass with a very long spike 15. MARAM.
- 11 { No tuft of hairs outside the flower within the outer glumes. Spikelets
 flat 11
 { Flowering glume with a fine awn on its back (sometimes shorter than
 the outer glume). No inner palea 9. FOXTAIL.
- 12 { Flowering glumes without awns. Inner palea present 12
 { Keel of the outer glumes expanded into a flat wing 6. PHALARIS.
- 13 { Keel of the outer glumes not winged 8. PHELUM.
 { Spikelets 3 together on each tooth of the simple, close, cylindrical
 spike, 1 or 2 of each cluster reduced to a pair of empty glumes.
 26. BARLEY.
- 14 { Spikelets small and numerous, in a close spike-like panicle, all con-
 taining flowers 14
 { Flowering glumes without awns 8. PHELUM.
- 15 { Flowering glumes awned as well as the outer ones 15
 { Spike ovate, with softly silky hairs 11. HARE'S-TAIL.
- 16 { Spike cylindrical or branched, not hairy 12. BEARDGRASS.

Spikelets 1-flowered, in a loose panicle.

- 16 { Spikelets ovate, obtuse or scarcely acute 17
 { Spikelets lanceolate, pointed 19
- 17 { Spikelets very flat, consisting of only 2 glumes, both keeled 1. LEERSIA.
 { Spikelets scarcely flattened. Two outer empty glumes about the size
 of the flowering one 18
- 18 { Spikelets rather large, containing within the outer glumes, besides the
 flower, a small, wedge-shaped, terminal glume or rudimentary
 flower. 38. MELICK.
- 19 { Spikelets small, containing nothing besides the flower within the outer
 glumes 2. MILIUM.
- 20 { Small tufts of hairs or hairy appendages at the base of the flower within
 the outer glumes 20
 { No hairs or hairy appendage at the base of the flower within the
 outer glumes 21
- 21 { No awns. A small hairy appendage at the base of the flower on each
 side 7. DIGRAPHIS.
- 22 { Flowering glume with a short fine awn. A tuft of hairs at the base of
 the flower 16. SMALLREED.

- 21 { Awns to all the glumes 12. BEARDGRASS.
 { Awns (often very small) to the flowering glume only or none. Outer
 glumes pointed, but not awned 23
 22 { Awns jointed with a tuft of hairs at the joint 17. AIRA.
 { Awns not jointed 23
 23 { Outer glumes swollen and very shining at the base . . . 14. NITGRASS.
 { Outer glumes not enlarged at the base 13. AGROSTIS.
 24 { Spikelets all sessile in a simple spike (branched only in accidental luxu-
 riant specimens) 26
 { Spikelets single or clustered, in a loose and spreading or close and spike-
 like panicle 25
 25 { Awns to some or all the glumes 31
 { Spikelets entirely without awns 40

Spikelets 2- or more flowered, sessile in a simple spike.

- 26 { Two spikelets to each tooth of the spike 25. LYMEGRASS.
 { Spikelets all solitary 27
 { Spikelets clustered along the axis of the spike 41
 27 { Spikelets with their sides to the main axis of the spike 28
 { Spikelets with one edge (the backs of the glumes) to the main axis . 29
 28 { Outer glumes nearly equal. Spikelets very closely sessile or indented.
 27. TRITICUM.
 { Outer glumes unequal. Spikelets almost sessile . . . 29. FALSE-BROME.
 29 { One empty glume at the base of each spikelet (except the terminal one).
 Spikelets indented in the axis 28. LOLIUM.
 { Two empty glumes at the base of each spikelet. Spikelets almost
 sessile 30
 30 { Perennial. Spikelets 6 lines long or more Meadow FESCUE.
 { Annual. Spikelets not above 3 lines long Darnel POA.

Spikelets 2- or more flowered, panicled, awned.

- 31 { Flowering glumes all awned 32
 { Spikelets with 1 awnless perfect flower, and 1 awned male flower . . 38
 32 { Awns inserted on the back of the flowering glumes near or below the
 centre. Hairs on the axis between the flowers short 33
 { Awns terminal. Flowering glumes surrounded by hairs longer than
 themselves 42. REED.
 { Awns terminal or nearly so. Axis of the spikelet without hairs . . 35
 33 { Spikelets 2-flowered 34
 { Spikelets 3- or more flowered 18. OAT.
 34 { Spikelets 2 lines or less. Awn fine, scarcely protruding beyond the
 glumes 17. AIRA.
 { Spikelets 3 or 4 lines long. Awn exserted. One of the flowers male only.
 19. FALSE-OAT.

- 35 { Awns quite or very nearly terminal, sometimes reduced to a very short point 36
 { Membranous edges of the glumes projecting in 2 points beyond the base of the awns 30. BROME.
 36 { Spikelets crowded in a close spike or dense clusters 37
 { Panicle loose or contracted into a long one-sided spike 31. FESCUE.
 37 { Outer spikelet of each cluster consisting of empty glumes only. 33. DOG'S-TAIL.
 { All the spikelets containing flowers 32. COCK'S-FOOT.
 38 { One terminal awnless flower and a lower male flower awned 3. PANICUM.
 { Awnless flower the lowest, with a terminal awned male one 39
 { Outer glumes 2 to 3 lines, completely enclosing the flowers and their awns. 20. HOLCUS.
 39 { Outer glumes 3 to 5 lines, the flowers or at least their awns protruding. 19. FALSE-OAT.

Spikelets 2- or more flowered, awnless, panicle or in a compound spike.

- { Spikelets 2 or 3 together to each notch of an apparently simple spike. 25. LYMEGRASS.
 40 { Spikelets sessile, in close clusters in an apparently simple spike or spike-like panicle 41
 { Spikelets more or less stalked, in a loose or contracted panicle 43
 { A small bract at the base of the spikelets or clusters 41. SESLERIA.
 41 { Outer spikelet of each cluster consisting of empty glumes 33. DOG'S-TAIL.
 { Spikelets all containing flowers without bracts at the base of the clusters 42
 42 { Spike cylindrical or slightly interrupted. Flowering glumes white and membranous 40. KÆLERIA.
 { Clusters one-sided, in an irregular spike or close panicle. Glumes herbaceous and rigid 32. COCK'S-FOOT.
 43 { Outer glumes enclosing the flowers or nearly so 44
 { Outer glumes shorter than the flowers 45
 44 { Glumes obtuse, coloured. 2 flowers with a wedge-shaped rudimentary glume 38. MELICK.
 { Outer glumes very acute. About 3 flowers in the spikelet, all perfect, with 3-toothed glumes 39. TRIODIA.
 { Glumes all acute. 2 male flowers and 1 smaller perfect one in the spikelet 4. HOLYGRASS.
 45 { First outer glume very small, second broadly truncate at the top, and often coloured. Flowers 2 in the spikelet 36. CATABROSE.
 { Both outer glumes pointed or obtuse, not truncate. Flowers usually 3 or more 46
 46 { Spikelets broadly ovate or orbicular. Glumes closely packed and very spreading 34. QUAKEGRASS.
 { Spikelets oblong or linear 47
 47 { Flowering glumes rounded on the back, at least at the base 48
 { Flowering glumes keeled on the back 49

- 48 { Flowering glumes obtuse or rather acute 35. POA.
 { Flowering glumes very pointed or shortly awned 31. FESCUE.
 { Flowering glumes very pointed. Flowers about 3, with a bristle-
 like continuation of the axis 37. MOLINIA.
 49 { Flowering glumes obtuse or acute. Flowers 3 or more, the last ter-
 minal 35. POA.

The limits of the numerous genera into which *Grasses* are divided are as yet far from being definitively fixed. Some are by no means natural, and those which are so have not always any definite characters. They have also been variously distributed into tribes, according to the special views of their structure entertained by different botanists. Taking however those which are now the most generally adopted, the eight following Tribes are represented in Britain. It will be observed, at the same time, that the short characters here given are by no means absolute, a few species (as, for instance, the common *Leersia*) being occasionally exceptional, or even in apparent contradiction to the general character of the tribe in which they are placed.

* *Spikelets with one perfect terminal flower, with or without a male or imperfect flower below it.* (PANICACEÆ.)

1. ORYZEÆ. Stamens more than 3 (except in 2 or 3 *Leersias*). Genus,—
1. LEERSIA.
2. PANICEÆ. Flowering glumes of a firmer texture than the empty ones below it. Genera :—2. MILIUM; 3. PANICUM.
3. PHALARIDEÆ. Two male or imperfect flowers or minute rudimentary glumes below the perfect flower besides the outer empty glumes. Genera :—
4. HOLYGRASS; 5. ANTHOXANTH; 6. PHALARIS; 7. DIGRAPHIS.

** *Spikelets with one or more perfect flowers, the male or rudimentary flowers, if any, terminal.* (POACEÆ.)

4. AGROSTIDEÆ. Spikelets 1-flowered, usually pedicellate. Genera :—8. PHLEUM; 9. FOXTAIL; 10. CHAMAGROSTIS; 11. HARE'S-TAIL; 12. BEARD-GRASS; 13. AGROSTIS; 14. NITGRASS; 15. MARAM; 16. SMALLREED.
5. AVENEÆ. Spikelets 2- or few flowered, pedicellate. Flowering glumes usually shorter than the outer ones, their awns often bent or twisted. Genera :—17. AIRA; 18. OAT; 19. FALSE-OAT; 20. HOLCUS.
6. CHLORIDEÆ. Spikelets 1- or several flowered, sessile along one side of the simple linear branches of the panicle. Genera :—21. CYNODON; 22. SPARTINA.
7. HORDEINEÆ. Spikelets 1- or several flowered, sessile in the notches of a simple spike. Genera :—23. LEPTURUS; 24. NARD; 25. LYMEGRASS; 26. BARLEY; 27. TRITICUM; 28. LOLIUM; 29. FALSE-BROME.
8. FESTUCEÆ. Spikelets several-flowered, pedicellate. Awns, if any, straight. Genera :—30. BROME; 31. FESCUE; 32. COCK'S-FOOT; 33. DOG'S-TAIL; 34. QUAKEGRASS; 35. POA; 36. CATABROSE; 37. MOLINIA; 38. MELICK; 39. TRIODIA; 40. KÆLERIA; 41. SESLERIA; 42. REED.

Among the exotic genera occasionally cultivated in our fields or gardens may be mentioned *Rye* (*Secale cereale*), the *Maize* or *Indian Corn* (*Zea Mays*), and the *Feather-grass* (*Stipa pennata*). The latter plant, a native of southern Europe, has by some mistake been inserted in some British Floras as having been found in Westmoreland.

I. **LEERSIA.** LEERSIA.

Spikelets loosely paniced, 1-flowered, flat, consisting of only 2 glumes, both of them keeled, without any inner 2-nerved palea. Stamens in the British species 3, in most exotic ones 6, 2, or 1.

A small genus, chiefly American, with 2 or 3 of the species spread over the warmer regions of the old world and Australia. It is doubtful whether in this and other genera of *Oryzæ* the inner glume should be considered as an anomalous palea, or as the flowering glume without any palea.

1. **Common Leersia.** *Leersia oryzoides*, Sw. (Fig. 1140.)

(Eng. Bot. Suppl. t. 2908.)

Stems about 2 feet high, the leaves, especially their sheaths, very rough. Panicle, when fully developed, loosely branched, spreading, 6 or 8 inches long, but in the British specimens usually much shorter, and partially included in the sheath of the last leaf. Spikelets numerous, all turning in one direction, 2 to nearly 3 lines long; the first glume rather broad, with 2 nerves on each side of the keel; the second much narrower, with 1 faint nerve on each side.

In wet places, ditches, and marshes, common in North America, extending over a great part of Asia, and more sparingly across central Europe to northern Italy, France, and Denmark. In Britain, only recently discovered in Hampshire, Sussex, and Surrey. *Fl. autumn.*



Fig. 1140.

II. **MILIUM.** MILIUM.

Spikelets loosely paniced, 1-flowered, without awns. Empty glumes

2, concave, nearly equal. Flowering glume concave, of a firmer texture, hard and shining when in fruit.

A genus of very few species, but widely dispersed over the globe; differing from *Panicum* chiefly by the want of the outermost small glume, from the large tropical genus *Paspalum* only in inflorescence.

1. **Spreading Milium.** *Milium effusum*, Linn. (Fig. 1141.)

(Eng. Bot. t. 1106.)

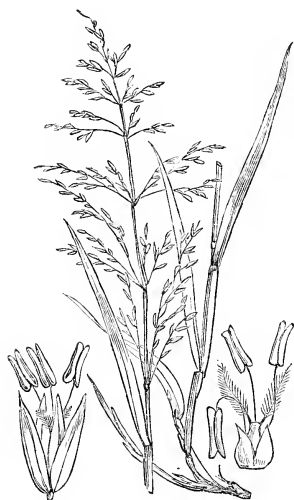


Fig. 1141.

A tall, slender Grass, often 4 or 5 feet high, with rather short, flat leaves, and a long, loose, slender and spreading panicle of small, pale-green or purple spikelets. Empty glumes concave but not keeled, 1 to $1\frac{1}{2}$ lines long, nearly smooth. Flowering glume almost as long, very smooth and shining. Palea nearly similar but rather smaller, faintly 2-nerved, and notched at the top.

In moist woods, widely spread over Europe, Russian Asia, and North America, extending from the Mediterranean to the Arctic Circle. Common in Britain. *Fl. summer.*

III. **PANICUM.** PANICUM.

Spikelets either in a loose or close and spike-like panicle, or along one side of the simple branches of a panicle, usually small, 1-flowered, rarely awned. Outer glumes usually 3; the first or lowest small, sometimes very minute, the next always empty, the third empty or with an imperfect or male flower in its axil. Flowering glume concave, of a firmer texture, hard when in fruit. Palea like the flowering glume, but rather smaller, and more or less 2-nerved.

A vast genus, chiefly tropical or North American, with a very few species spreading into Russian Asia and Europe, including most of the cultivated *Millets* of southern Europe, Africa, and Asia. It is in most

cases easily recognized by the small first or outermost glume, which in some species is reduced to an almost microscopical scale.

Spikelets 2 together, along one side of the linear, digitate branches of the panicle. (DIGITARIA.)

Spike-like branches of the panicle 2 to 4 inches long . . . 1. *Fingered P.*

Spike-like branches not above an inch long . . . 2. *Glabrous P.*

Spikelets crowded in a simple or branched, spike-like panicle.

Spike-like panicle cylindrical, the spikelets intermixed with numerous long, awn-like bristles. (SETARIA.)

Bristles rough with reversed hairs, felt as the spike is drawn downwards through the hand . . . 3. *Rough P.*

Bristles rough with erect hairs, felt as the spike is pushed upwards through the hand.

Flowering glume marked with transverse wrinkles . . . 4. *Glaucous P.*

Flowering glume not wrinkled . . . 5. *Green P.*

Panicle pyramidal, without awn-like bristles, but the spikelets sometimes coarsely awned (ECHINOCHLOA) . . . 6. *Cockspur P.*

1. **Fingered Panicum.** *Panicum sanguinale*, Linn.

(Fig. 1142.)

(Eng. Bot. t. 849. *Digitaria*, Brit. Fl.)

An annual, with stems from 1 to 2 feet long, more or less spreading or creeping at the base, then ascending or erect. Leaves flat, more or less hairy. The panicle consists of 2 to 6 or rarely more, simple, slender branches, 2 to 4 inches long, and all spreading from nearly the same point at the top of the peduncle so as to appear digitate. Spikelets in pairs along one side of these branches, one sessile, the other shortly stalked, each about 1 line long. First glume very minute, almost microscopical; the second concave, and about half the length of the third, which is nearly flat, and 5-nerved. Flowering glume about the same length, very smooth, and awnless.

One of the commonest weeds in all tropical and warm countries, becoming less frequent in central Europe, and scarcely extending into Russian Asia beyond the Caspian. In Britain, only as an introduced weed of cultivation in the south of England. *Fl. the whole season.*



Fig. 1142.

2. **Glabrous Panicum.** *Panicum glabrum*, Gaud.

(Fig. 1143.)

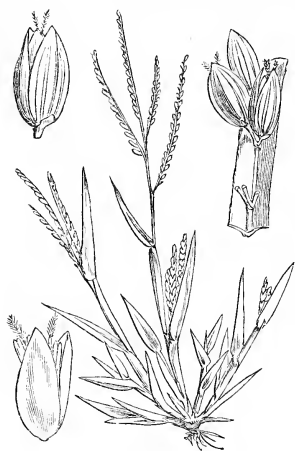
(*Digitaria humifusa*, Eng. Bot. Suppl. t. 2613.)

Fig. 1143.

Very much like the *fingered P.*, but a much smaller plant; the panicle has only 2 or 3 spike-like branches, each scarcely above an inch long, and the spikelets are fewer. The first glume is, as in the last species, very minute, but the two next empty ones are both about the same length as the flowering glume.

A weed of warm climates, like the last, but rather less tropical, more generally spread over central Europe, extending northward to southern Scandinavia, and better established in the south of England. *Fl. summer and autumn.*

3. **Rough Panicum.** *Panicum verticillatum*, Linn.

(Fig. 1144.)

(Eng. Bot. t. 874. *Setaria*, Brit. Fl.)

Fig. 1144.

A glabrous, erect annual, 1 to 2 feet high, with flat leaves, rough on the edges. Spikelets small, crowded into a cylindrical but rather loose, compound spike (or rather spike-like panicle), 1 to 2 inches long, interspersed with numerous bristles, 2 or 3 lines long, inserted under the spikelets but projecting beyond them. These are rough with minute hairs, reversed so as to cling to the hand when the spike is drawn downwards through the fingers. First glume very small, the two next about the length of the flowering one.

In cultivated and waste places, very common in southern Europe, and generally spread over central Europe to the Baltic, and eastward into Russian Asia, but much rarer in hot countries than the two following species. In Britain, it appears occasionally in the south of England. *Fl. summer and autumn.*

4. **Glaucous Panicum.** *Panicum glaucum*, Linn.

(Fig. 1145.)

(*Setaria*, Brit. Fl.)

An erect annual, very much like the *rough P.*, but of a paler green; the spike or spike-like panicle more compact and regularly cylindrical, 1 to 1½ inches long, with very numerous projecting bristles. These are but slightly rough with minute erect teeth, so as only to be felt as the spike is pushed upwards through the fingers. Spikelets rather larger than in the *rough P.*; the second glume rather shorter than the third, the flowering one marked with numerous transverse wrinkles, visible especially as the seed ripens.

One of the commonest weeds of cultivation throughout the warmer regions of the globe, abundant in southern Europe, less so in central Europe, not extending into Scandinavia. In Britain, only occasionally introduced into southern England. *Fl.* all summer and autumn.



Fig. 1145.

5. **Green Panicum.** *Panicum viride*, Linn. (Fig. 1146.)(Eng. Bot. t. 875. *Setaria*, Brit. Fl.)

Closely resembles the *glaucous P.*, but the second and third glumes are both about the same length, and the flowering one has no transverse wrinkles.

With the same geographical range as the *glaucous P.*, this is, however, much less common in tropical countries, but more so in central Europe, extending eastward all across Russian Asia, and northward into southern Scandinavia. In Britain, it is also rather better established in the south of England than the other species, except the *glabrous P.* *Fl.* summer and autumn.



Fig. 1146.

6. Cockspur Panicum. *Panicum Crus-galli*, Linn.

(Fig. 1147.)

(Eng. Bot. t. 876. *Echinochloa*, Bab. Man.)

Fig. 1147.

A coarse decumbent, rather broad-leaved annual. Panicle 4 to 6 inches long, irregularly pyramidal, and rather one-sided; the spikelets larger than in the preceding species, crowded or clustered along the spike-like branches, the lowest of which are 1 to 2 inches long, diminishing gradually to the top. Lowest glume very short and broad, the next about the length of the flower, empty and awnless, the third about as long, ending in either a short point or a long, coarse awn, and has often a thin palea in its axil. Flowering glume awnless, smooth and shining.

Almost as common and widely-spread a weed of hot countries, especially in the old world, as the *fingered P.* and the *glaucous P.*, and more abundant than either of them in temperate Europe and Russian Asia, extending northwards to southern Scandinavia. In Britain, occasionally only, as a weed of cultivation in southern England. *Fl. the whole summer and autumn.*

IV. **HOLYGRASS.** *HIEROCHLOE.*

Panicle exotic spreading (in some species narrow and crowded). Spikelets 3-flowered; the 2 lower flowers male only, with 3 stamens; the uppermost smaller but hermaphrodite, with 2 stamens. Glumens all scarious, boat-shaped, keeled, and pointed; the outer empty ones as long as the flowers.

A genus of several species, spread over the colder regions of both the northern and southern hemispheres, and closely allied on the one hand to *Anthoxanth*, on the other to *Holcus*.

1. **Northern Holygrass.** *Hierochloa borealis*, Rœm. et Sch.
(Fig. 1148.)

(Eng. Bot. t. 2341.)

A perennial, from $\frac{3}{4}$ to $1\frac{1}{2}$ feet high, with a creeping rootstock, and flat leaves, usually short. Panicle spreading, about 2 inches long, with slender branches. Spikelets ovate, of a shining brown; the outer empty glumes very pointed, near 3 lines long, and glabrous. Two lower flowering glumes attaining to the length of the outer ones, but rough on the outside with short hairs, each enclosing a 2-nerved palea and 3 stamens. Uppermost flowering glume smaller and nearly glabrous, enclosing a still smaller 2-nerved palea, 2 stamens, and the pistil.



Fig. 1148.

In mountain pastures and waste places, at high latitudes, in northern and Arctic Europe, Asia, and America, descending southwards to northern Germany, and to the mountains of south-eastern Germany, and reappearing in New Zealand. In Britain, only near Thurso in Caithness, where it has been recently detected by Mr. R. Dick. *Fl. summer.*

V. ANTHOXANTH. ANTHOXANTHUM.

Spikelets 1-flowered, narrow, pedicellate, but crowded into a cylindrical spike or spike-like panicle. Two outer glumes unequal, keeled, pointed but not awned; the 2 next also empty, shorter than the outer ones, narrow, hairy; one with a small awn on its back, the other with a longer awn arising from its base; flowering glume still shorter, much broader, obtuse, and awnless. Palea narrow and scarious, with a central nerve like the glumes. Stamens only 2.

The genus consists but of a single species.

1. **Sweet Anthoxanth.** *Anthoxanthum odoratum*, Linn.
(Fig. 1149.)

(Eng. Bot. t. 647. *Vernal Grass.*)

A rather slender, erect perennial, 1 to 2 feet high, and quite glabrous.



Fig. 1149.

Spike-like panicle $1\frac{1}{2}$ to 2 inches long. Outer glumes very pointed; the second about 3 lines long, the first seldom above half that length. Flowering glumes usually quite included in them, or rarely the longest awn slightly protrudes.

In meadows and pastures, throughout Europe and Russian Asia, from the Mediterranean to the Arctic regions. Abundant in Britain, imparting a sweet scent to new-made hay. *Fl. spring and early summer, and often again in autumn.*

VI. **PHALARIS.** PHALARIS.

Spikelets 1-flowered, broad and very flat, densely crowded into an ovoid or cylindrical spike or spike-like panicle as in *Phleum*, but the glumes have the keel projecting into a scarious wing, and there are usually 1 or 2 minute scales or rudimentary glumes between the outer empty glumes and the flowering one.

A small genus, chiefly from the Mediterranean region and central Asia.

1. **Canary Phalaris.** *Phalaris canariensis*, Linn.

(Fig. 1150.)

(Eng. Bot. t. 1310.)

An erect, leafy annual, 2 to 3 feet high, with a densely imbricated, ovoid, spike-like panicle, 1 to $1\frac{1}{2}$ inches long, variegated with green and white, and quite glabrous. Outer glumes very flat, 3 to 4 lines long, acute but not awned, white on the edges, with a broad green line down each side. Flowering glume much shorter, narrow and pointed, smooth and shining, hardening round the seed as it ripens.

A native of southern Europe and northern Africa, much cultivated as *Canary-seed* in many parts of central and even northern Europe, and frequently appearing as a weed of cultivation. In Britain, only known as such in some parts of southern England. *Fl. summer.*

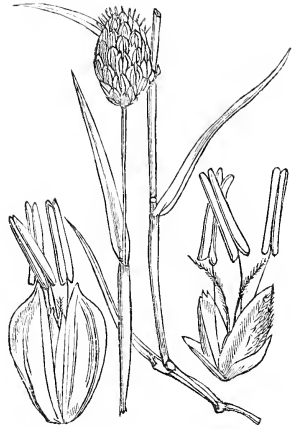


Fig. 1150.

VII. DIGRAPHIS. DIGRAPHIS.

A single species, often united with *Phalaris*, of which it has the rudimentary glumes immediately under the flowering ones, but it is very different in inflorescence, and the outer glumes are not winged on the keel.

1. Reed Digraphis. *Digraphis arundinacea*, Trin.

(Fig. 1151.)

(*Phalaris*, Eng. Bot. t. 402.)

A reed-like perennial, 2 to 3 feet high, with rather broad, long leaves, densely tufted at its base. Spikelets very numerous, in a panicle 6 to 8 inches long, rather compact, but not closely imbricated nor spike-like as in *Phalaris* and *Phleum*; the lower branches often spreading. Outer glumes about 2 lines long, lanceolate and pointed, but not awned, keeled but not winged, pale-green or whitish with green nerves. Flowering glume smooth and shining, and hardened round the seed as in *Phalaris*, with two minute, linear hairy scales or rudimentary glumes at its base, one on each side.

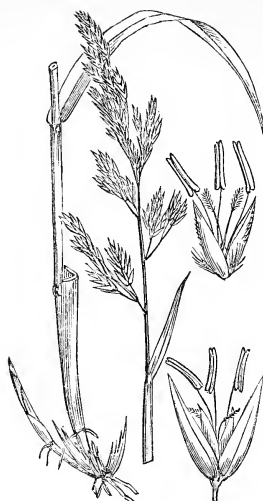


Fig. 1151.

On river-banks and in marshes, in Europe, Russian Asia, and North America, extending from the Mediterranean to the Arctic regions. Common in Britain. *Fl. summer*. A variety with variegated leaves is often cultivated in gardens under the name of *Striped-grass* or *Ribbon-grass*.

VIII. **PHLEUM**. PHLEUM.

Spikelets 1-flowered, flat, and crowded into a cylindrical or ovoid spike or spike-like panicle. Outer glumes boat-shaped, their keels projecting into a point or very short awn. Flowering glume shorter, very thin, awnless or with a very short awn on the back. Palea very thin, sometimes with a minute bristle at its base outside, which is the continuation of the axis of the spikelet.

A small genus, widely spread over the temperate and colder regions of the northern hemisphere, distinguished from *Foxtail* chiefly by the presence of the palea.

Outer glumes truncate and broadly scarious below the point.

Spike long and cylindrical. Points of the outer glumes not half so long as the glume itself

1. *Timothy P.*

Spike short, ovoid or oblong. Points or awns of the outer glumes nearly as long or longer than the glume itself

2. *Alpine P.*

Outer glumes tapering into a minute point.

Perennial. Outer glumes linear-lanceolate

3. *Bæhmer's P.*

Annual.

Outer glumes wedge-shaped, less than a line long; the lateral ribs inconspicuous. Spike long and slender

4. *Rough P.*

Outer glumes lanceolate, strongly ciliated on the keel, $1\frac{1}{2}$

lines long; the lateral ribs prominent. Spike short

5. *Sand P.*

1. **Timothy Phleum.** *Phleum pratense*, Linn. (Fig. 1152.)

(Eng. Bot. t. 1076. *Timothy-grass. Cat's-tail.*)

A perennial, 1 to 3 feet high; the leaves rather soft, although rough on the edges. Spike (or spike-like panicle) cylindrical and very compact, from 1 to 3 or even 4 inches long, with very numerous small spikelets. Outer glumes about a line long, with broad, scarious edges, truncate at the top; the green keel slightly ciliate and projecting into a point shorter than the glume itself. Flowering glume entirely included in the outer ones and closely covering the palea; the stamens and styles protruding from the top.

In meadows and pastures, in Europe and Russian Asia, from the Mediterranean to the Arctic region. Abundant in Britain. *Fl.* early summer, and often again in autumn.



Fig. 1152.

2. **Alpine Phleum.** *Phleum alpinum*, Linn. (Fig. 1153.)

(Eng. Bot. t. 519.)

Perennial like the last, but usually of much lower stature; the sheaths of the upper leaves very loose or inflated. Spike ovoid or oblong, seldom an inch long, usually assuming a purplish hue. Outer glumes truncate as in the *Timothy P.*, but the keel lengthened into an awn, varying from 1 to 2 lines in length.

In alpine pastures, in northern and Arctic Europe, Asia, and America, and in the mountain-chains of central and southern Europe, the Caucasus and Altai, reappearing in Antarctic America. In Britain, only in the higher Scottish mountains. *Fl.* summer.

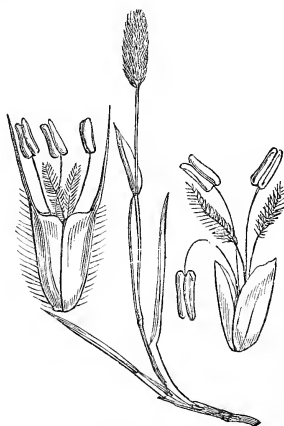


Fig. 1153.

3. Bœhmer's Phleum. *Phleum Bœhmeri*, Schrad. (Fig. 1154.)

(*Phalaris phleoides*, Eng. Bot. t. 459.)



Fig. 1154.

An erect perennial, like the *Timothy P.* but usually smaller, with shorter leaves, the sheaths not enlarged. Spike cylindrical, 1 to 3 inches long, not quite so dense as in the *Timothy P.* Outer glumes narrow-lanceolate, tapering into a minute point, without hairs on the keel, and with a narrow, scarious edge. Flowering glume much smaller. Palea with a minute bristle at its base outside.

In dry fields, and waste places, generally dispersed over Europe and Russian Asia, except the extreme north. Rare in Britain, and chiefly found in some of the eastern counties of England. *Fl.* summer, rather early.

4. Rough Phleum. *Phleum asperum*, Jacq. (Fig. 1155.) (*P. paniculatum*, Eng. Bot. t. 1077.)



Fig. 1155.

An annual, 6 inches to a foot high, with a cylindrical spike like that of the *Bœhmer's P.*, but the spikelets are smaller and more numerous. Outer glumes less than a line long, of a firm texture, smooth or scarcely rough, narrow at the base, enlarged upwards, and contracted rather suddenly into a very short point, the lateral nerves scarcely prominent. Flowering glume very small.

In dry fields, and waste places, in central and southern Europe, extending eastward to the Caucasus, and northward into eastern France and central Germany. Rare in Britain, if indeed it really exists in Cambridgeshire and the few other English counties where it has been indicated. *Fl.* summer.

5. Sand Phleum. *Phleum arenarium*, Linn. (Fig. 1156.)

(Phalaris, Eng. Bot. t. 222.)

An erect annual, 6 to 8 inches high, with short leaves. Spike $\frac{3}{4}$ to $1\frac{1}{4}$ inches long, dense and nearly cylindrical, but more or less tapering at the base. Spikelets about $1\frac{1}{2}$ lines long. Outer glumes lanceolate, tapering into a short point; the keel ciliate with stiff hairs, and a very prominent nerve on each side. Flowering glume not one-third the length of the outer ones.

In maritime sands, chiefly in western Europe, extending, however, far along the shores of the Baltic in the north, and of the Mediterranean in the south. Common on the coasts of England and Ireland, but rare in Scotland. *Fl.* spring and early summer.



Fig. 1156.

IX. **FOXTAIL.** ALOPECURUS.

Spikelets 1-flowered, flat, and densely crowded into a cylindrical spike or spike-like panicle. Outer glumes boat-shaped, with a prominent keel, but not awned. Flowering glume shorter, with a very slender awn inserted on the back (sometimes concealed under the outer glumes). Palea entirely wanting.

A small genus, widely spread over the temperate and colder regions of both the northern and the southern hemispheres, resembling *Phleum* in habit, but easily distinguished by the absence of the palea.

- Annual. Outer glumes 3 lines long, united to the middle,
glabrous or nearly so 1. *Slender F.*
Perennials or rarely annuals. Outer glumes less than 3 lines,
free or united at the base only; the keel hairy.
Spikes long. Awns more or less prominent.
Stem erect or nearly so. Outer glumes lanceolate, about
2 lines. Awns twice as long 2. *Meadow F.*
Stems procumbent at the base. Outer glumes not $1\frac{1}{2}$
lines. Awns not twice as long 3. *Marsh F.*
Spikes short. Awns scarcely exceeding the outer glumes 4. *Alpine F.*

1. Slender Foxtail. *Alopecurus agrestis*, Linn. (Fig. 1157.)

(Eng. Bot. t. 848.)



Fig. 1157.

An annual, 1 to 2 feet high, erect or slightly decumbent at the base. Leaves rather short, with long, not very loose sheaths. Spike 2 to 3 inches long, thinner and more pointed than in the other species; the spikelets fewer, longer (about 3 lines), not so flat nor so closely imbricated, and usually quite glabrous; the 2 outer glumes united to about the middle, the hair-like awn of the flowering one projecting 2 or 3 lines beyond them.

In waste places, on roadsides, etc., in central and southern Europe and across Russian Asia, extending northward to southern Scandinavia. In Britain, frequent in the south of England, decreasing northwards; in Scotland only where accidentally introduced, and not mentioned in the Irish Flora. *Fl. the whole season.*

2. Meadow Foxtail. *Alopecurus pratensis*, Linn. (Fig. 1158.)

(Eng. Bot. t. 759.)



Fig. 1158.

Rootstock perennial and shortly creeping, the stems erect or scarcely decumbent at the base, 1 to 2 feet high. Sheaths of the upper leaves rather loose. Spike 2 to 3 inches long, very dense, rather obtuse; the spikelets very numerous and flat, 2 to nearly 3 lines long. Outer glumes free or scarcely united at the base, with short hairs on the keel, which give to the spike a soft, hairy aspect. The hair-like awns project 2 to 4 lines beyond the outer glumes.

In meadows and pastures, throughout Europe and central and Russian Asia, from the Mediterranean to the Arctic regions, and naturalized in several parts of the globe. Abundant in Britain. *Fl. spring and summer.*

3. Marsh Foxtail. *Alopecurus geniculatus*, Linn.

(Fig. 1159.)

(Eng. Bot. t. 1250.)

A perennial like the *meadow F.*, or sometimes annual. Stem usually procumbent at the base, bending upwards at the lower nodes. Sheaths of the upper leaves rather loose. Spike 1 to 2 inches long, closely imbricated like that of the *meadow F.*, but more slender, with much smaller spikelets. Outer glumes hairy on the keel, not so pointed as in the *meadow F.*, and scarcely above a line long, the hair-like awns not projecting above a line beyond them.

In moist meadows, and marshy places, throughout Europe and Russian Asia from the Mediterranean to the Arctic regions, and naturalized in other parts of the globe. Abundant in Britain. *Fl. all summer*. A slight variety, with still shorter awns, has been described under the name of *A. fulvus* (Eng. Bot. t. 1467), and in some localities, especially near the sea, the stems thicken at the base into a kind of bulb, which state has also been distinguished as a species, under the name of *A. bulbosus* (Eng. Bot. t. 1249).

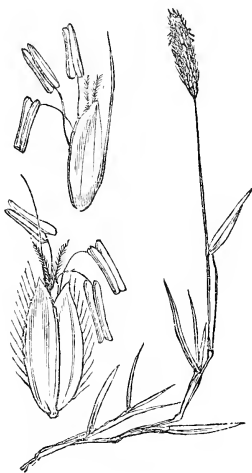


Fig. 1159.

4. Alpine Foxtail. *Alopecurus alpinus*, Sm. (Fig. 1160.)

(Eng. Bot. t. 1126.)

Rootstock creeping and stems erect, as in the *meadow F.*, but usually not so tall, and the sheaths of the upper leaves looser. Spike ovoid or shortly cylindrical, seldom above an inch long unless cultivated, and softly silky with the rather long hairs which cover the glumes. Spikelets closely imbricated, rather smaller than in the *meadow F.*; the awns either included within the outer glumes or scarcely projecting beyond them.



Fig. 1160.

A high northern plant, extending from east Arctic Europe across Arctic Asia and America, and reappearing in the Antarctic regions. In Britain, it occurs in the higher mountains of Scotland, although unknown in Scandinavia. *Fl. summer.*

X. **CHAMAGROSTIS.** CHAMAGROSTIS.

A single species, differing from *Agrostis* chiefly in the inflorescence, which is a simple spike nearer that of the *Hordeineæ*, although the spikelets are not closely sessile enough to remove it to that tribe.

1. Dwarf Chamagrostis. *Chamagrostis minima*, Borkh.

(Fig. 1161.)

(*Knappia agrostidea*, Eng. Bot. t. 1127.)



Fig. 1161.

A little, tufted annual, seldom 3 inches high. Leaves short and narrow, with very thin sheaths. Spikelets small, purplish, almost sessile in a simple slender spike, about half an inch long. Outer glumes nearly equal, obtuse, about a line long. Flowering glume shorter, very thin and scarious, hairy outside, jagged at the top, but not awned. Palea small or sometimes none.

In sandy pastures, and waste places, in western Europe, not extending in central Europe much to the eastward of the Rhine, although in the south it reaches as far as Greece. Rare in

Britain, and apparently confined to the coasts of Anglesea and the Channel Islands. *Fl. spring.*

VI. HARE'S-TAIL. LAGURUS.

A single species, with the characters nearly of *Smallreed*, except the inflorescence, which is that of *Foxtail*.

1. Ovate Hare's-tail. *Lagurus ovatus*, Linn. (Fig. 1162.)

(Eng. Bot. t. 1334.)

An erect annual, from a few inches to above a foot high; the leaves hoary with a soft down, their sheaths rather swollen. Spikelets 1-flowered, very numerous, and closely crowded in an ovoid or oblong, softly hairy head, $\frac{1}{2}$ to 1 inch long. Outer glumes subulate or slightly dilated at the base, about 4 lines long, feathered with long soft hairs. Flowering glume much shorter, and thin, cleft into 2 awn-like points about the length of the outer glumes, and bearing on its back a long, hair-like, bent awn, usually at least twice the length of the spikelet.

In maritime sands, and waste places, common all round the Mediterranean, and extending up the west coast of Europe to the Channel Islands. *Fl. early summer.*

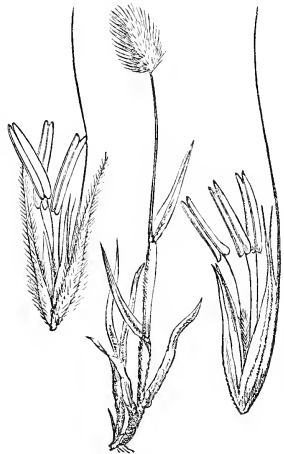


Fig. 1162.

XII. BEARDGRASS. POLYPOGON.

Spikelets 1-flowered, densely crowded in a spike-like or slightly branched panicle, otherwise as in *Agrostis*, except that the outer glumes end in a fine awn.

A genus of very few species, but widely spread over a great part of the globe.

Awns three or four times as long as the spikelets 1. *Annual B.*
 Awns scarcely longer than the glumes themselves 2. *Perennial B.*

1. Annual Beardgrass. *Polypogon monspeliensis*, Desf.
(Fig. 1163.)

(*Agrostis panicea*, Eng. Bot. t. 1704.)



Fig. 1163.

An annual, procumbent at the base or rarely erect, 1 to 1½ feet high, with flat, rather flaccid leaves. Panicle contracted into a cylindrical or slightly branched spike, 2 to 3 inches long, of a yellowish shining green, and thickly bearded with the numerous straight and very smooth awns. Outer glumes nearly equal, notched at the top; the fine awn proceeding from the notch, and 3 or 4 times as long as the glume itself. Flowering glume shorter, often with a short, very fine awn. Palea smaller and awnless.

In fields and waste places, on roadsides, etc., especially near the sea, common in the Mediterranean region, and eastward far into central Asia, extending up the west coast of Europe to western France, and very sparingly along the Channel to Holland. Rare in Britain, and only in some of the south-eastern counties of England. *Fl. summer.*

2. Perennial Beardgrass. *Polypogon littoralis*, Sm.
(Fig. 1164.)

(*Agrostis*, Eng. Bot. t. 1251.)



Fig. 1164.

A procumbent perennial, with the foliage nearly of the *common Agrostis*. Panicle more branched than in the *annual P.*, the glumes longer, tapering into an awn scarcely longer than the glume itself. Flowering glumes small and awnless. The plant is, indeed, in habit as well as in character, almost intermediate between *Beardgrass* and *Agrostis*.

In salt-marshes, scattered here and there along the seacoasts of western Europe, the Mediterranean, and North America. In Britain, very local on the coasts of Norfolk, Essex, Kent, and Hampshire. *Fl. summer.*

XIII. **AGROSTIS.** AGROSTIS.

Spikelets small, 1-flowered, and numerous, in an elegant panicle, with slender branches often proceeding several from the same point, and either erect, forming a narrow, almost spike-like, but loose panicle, or spreading, at least at the moment of flowering. Outer glumes narrow, boat-shaped, pointed, but without awns. Flowering glume shorter, often bearing a fine straight awn on the back below the middle. Palea much smaller or altogether wanting. The axis of the spikelet within the outer glumes glabrous or very shortly hairy.

A considerable genus, widely distributed over the surface of the globe, and (if made to include the exotic *Vilfa* and *Sporobolus*) a well-marked one. Some species are commonly called *Bents* in some parts of the country, a name given by others more especially to the *crested Dog's-tail*.

Awn 2 to 4 times as long as the spikelets. Second glume

longer than the lowest 4. *Silky A.*

Awn none, or not twice as long as the spikelet. Outer glumes equal or the lowest the longest.

Leaves flat (broad or narrow).

Flowering glume awnless or with a very short awn at its base. Palea about half its length 1. *Common A.*

Flowering glume with a short awn below the middle.

Palea minute or none 2. *Brown A.*

Leaves very fine and subulate 3. *Bristle A.*

1. **Common Agrostis.** *Agrostis alba*, Linn. (Fig. 1165.)

(Eng. Bot. t. 1189, *A. stolonifera*, t. 1532, and *A. vulgaris*, t. 1671.)

An elegant but most variable perennial grass; in dry mountain pastures often densely tufted, and not above 2 or 3 inches high; in rich moist soils creeping and rooting at the base, often to a considerable extent; the flowering stems erect, 1 to 2 feet high, with a slender panicle usually very spreading when in full flower, especially in fine weather, sometimes contracted both before and after flowering. Leaves flat, rather short, but narrow. Spikelets scarcely a line long. Outer glumes nearly equal or the lowest rather the largest. Flowering glume very thin, awnless or rarely with a minute awn arising from its base. Palea usually a little less than half its length.

In pastures and waste places, wet or dry, throughout Europe, Russian and central Asia, and northern America, penetrating far into the Arctic regions, and ascending high upon alpine summits, and reappearing



Fig. 1165.

in the southern hemisphere. Abundant in Britain. *Fl.* the whole summer. Besides the great differences in size and stature, it varies in the more or less spreading panicle of a light-green or purplish colour, in the length of the ligula of the leaves, in the degree of prominence of the nerves of the glumes and the roughness of their keel, and in other minute particulars; but all attempts to combine these characters so as to show distinct species, or even to separate marked and permanent varieties, have hitherto failed.

2. Brown Agrostis. *Agrostis canina*, Linn. (Fig. 1166.)

(Eng. Bot. t. 1856.)



Fig. 1166.

Very near the *common A.*, but the leaves are rather finer, the panicle less spreading, the outer glumes longer and more pointed; the flowering one bears on its back below the middle a fine awn, which slightly protrudes beyond the outer glumes, and the palea is very minute or wholly wanting.

With the *common A.*, of which it may be a mere variety, and has apparently the same geographical range, but not generally common except perhaps in some mountain districts. Spread over the whole of Britain. *Fl.* summer.

3. Bristle Agrostis. *Agrostis setacea*, Curt. (Fig. 1167.)

(Eng. Bot. t. 1188.)

A perennial, with densely tufted leaves, mostly radical, and very finely subulate. Stems erect, 1 to 2 feet high, with a narrow, slender

panicle, always contracted except during the moment the flowers are expanded. Glumes narrow, and more pointed than in the *common A.*, the lowest always longer than the second, the flowering one with a fine awn at its base, usually slightly protruding beyond the outer glumes. Palea very minute.

On dry heaths, in western Europe, from Spain and Portugal to Holland. In Britain, only in the south-western counties of England, extending eastward to Hampshire, and perhaps Sussex and Surrey. *Fl. summer.*



Fig. 1167.

4. **Silky Agrostis.** *Agrostis Spica-venti*, Linn. (Fig. 1168.)

(Eng. Bot. t. 951. *Apera*, Bab. Man.)

A rather tall, slender, and most elegant annual, with rather narrow, flat leaves. Panicle long, and usually spreading, with very slender, hair-like branches, and little shining spikelets, scarcely a line long, without the awns. Outer glumes narrow, very pointed, the second rather larger than the lowest one. Flowering glume with a hair-like awn, 3 or 4 times as long as the spikelet. Palea small, with a minute, almost microscopic appendage at its base, which is the prolongation of the axis of the spikelet.

In fields and sandy pastures, in Europe and Russian Asia, from the Mediterranean to the Arctic regions. In Britain, confined to some of the eastern counties of England. *Fl. summer.* The *A. interrupta* (Eng. Bot. Suppl. t. 2951) is a slight variety, with the spikelets more crowded, in a narrow panicle, with nearly erect branches. The anthers are also said to be shorter,



Fig. 1168.

but that character is very variable. It is often found with the common form passing gradually into it.

XIV. **NITGRASS.** *GASTRIDIDIUM.*

A single species, separated from *Agrostis* on account of the smooth, shining, enlarged base of the outer glumes.

1. **Awned Nitgrass.** *Gastridium lendigerum*, Beauv. (Fig. 1169.)

(*Milium*, Eng. Bot. t. 1107.)



Fig. 1169.

An elegant, erect annual, 6 to 8 inches high, with flat leaves. Panicle contracted into a loose, tapering spike, 2 to 3 inches long, of a pale green, shining with a satiny or silvery lustre. Spikelets very crowded. Outer glumes nearly 2 lines long, narrow, and very pointed, with a short, very shining enlargement at the base, the second glume shorter than the lowest. Flowering glume very short, broad, and thin, often bearing below the summit an awn about the length of the outer glume, but as often without it. Palea nearly as long.

In fields and waste places, especially near the sea, but occasionally also inland along the valleys of large rivers. Very common in the Mediterranean region, extending up western France to the English Channel. In Britain, only in southern England. *Fl. summer.*

XV. **MARAM.** *PSAMMA.*

A single species, sometimes united with *Smallreed*, but more frequently considered as a distinct genus, characterized by the inflorescence, the firmer consistence of the glumes, without any awn to the flowering one.

1. **Sea Maram.** *Psamma arenaria*, Beauv. (Fig. 1170.) (*Arundo*, Eng. Bot. t. 520. *Ammophila arundinacea*, Brit. Fl. *Maram*, or *Sea Matweed*.)

Rootstock creeping. Stems stiff, erect, 2 to 3 feet high, with narrow, stiff, erect, and glaucous leaves, concave, or rolled inwards on their

edges. Panicle contracted into a close, narrow-cylindrical spike, 5 or 6 inches long, tapering to the top. Spikelets crowded, 4 or 5 lines long, the outer glumes lanceolate, compressed, stiff, and chaffy. Flowering glume rather shorter, but equally stiff, with a tuft of hairs outside on the axis of the spikelet. Palea nearly as long, with a minute hairy bristle, or prolongation of the axis at its base.

On maritime sands, common on all the coasts of Europe, except the extreme north, and in North America. Frequent in Britain and on the British seacoasts. *Fl. summer.*



Fig. 1170.

XVI. SMALLREED. CALAMAGROSTIS.

Tall grasses, with a more or less open panicle, and numerous 1-flowered spikelets. Outer glumes nearly equal, keeled and pointed. Flowering glume much smaller, very thin, with a very slender and short, hair-like, straight awn on its back, and a tuft of long silky hairs at its base, on the axis of the spikelet. Palea usually smaller.

A considerable genus, widely distributed over the globe, formerly united with the true *Reeds*, from which it is distinguished chiefly by the 1-flowered spikelets.

Hairs within the spikelet longer than the flowering glume.

Spikelets near 3 lines long, crowded in a narrow panicle.

Outer glumes very narrow, almost subulate 1. *Wood S.*

Spikelets about 2 lines long, in a loose panicle. Outer

glumes narrow-lanceolate 2. *Purple S.*

Hairs within the spikelet shorter than the flowering glume 3. *Narrow S.*

1. Wood Smallreed. *Calamagrostis Epigeios*, Roth.

(Fig. 1171.)

(*Arundo*, Eng. Bot. t. 403.)

Rootstock creeping. Stems 3 or 4 feet high, erect, and rather firm,



Fig. 1171.

2. Purple Smallreed. *Calamagrostis lanceolata*, Roth.
(Fig. 1172.)

(*Arundo Calamagrostis*, Eng. Bot. t. 2159.)



Fig. 1172.

with long, narrow, somewhat glaucous leaves. Panicle branched, but not spreading, except whilst in full flower, from a few inches to near a foot long, with numerous crowded spikelets, often assuming a purplish tint. Outer glumes very narrow lanceolate and pointed, almost subulate, both near 3 lines long. Flowering glume thin, its awn very short and slender, inserted some way from the top, and scarcely distinguishable from the long silky hairs which envelope the flower.

In moist, open places, in woods and thickets, and amongst bushes, spread over the greater part of Europe and Russian Asia from the Mediterranean to the Arctic regions. Abundant in some parts of southern England and Ireland, but not generally common, and rare in Scotland. *Fl. summer.*

A tall grass, like the last, and not always readily distinguished from it. It is usually more slender, with flat, flaccid leaves. Panicle much looser, 5 or 6 inches long, with slender branches, and more often assuming a shining purple colour. Outer glumes about 2 or sometimes $2\frac{1}{2}$ lines long, narrow-lanceolate, but broader than in the *wood S.* Flowering glume nearly as in that species, but the awn is inserted close to the cleft summit.

In moist woods, and shady places, in northern and central Europe, and Russian Asia, from northern France and the Alps to the Arctic regions. Dispersed over several parts of England, but not so common as the *wood S.*, and unknown in Ireland or Scotland. *Fl. summer.*

3. **Narrow Smallreed.** *Calamagrostis stricta*, Nutt.

(Fig. 1173.)

(*Arundo*, Eng. Bot. t. 2160.)

A more erect plant than the *purple S.*, $1\frac{1}{2}$ to 3 feet high, with stiffer, narrow leaves. Panicle very narrow, 4 to 6 inches long. Spikelets smaller than in the last species, the outer glumes broader. Hairs of the axis considerably shorter than the flowering glume, which has an awn inserted rather below the middle, and reaching to about its own length. There is also at the base of the palea a rudimentary prolongation of the axis, in the shape of a minute bristle, with a tuft of hairs.

In bogs and marshes, in northern and Arctic Europe, Asia, and America, not reaching southward of northern Germany. Rare in Britain, having been formerly found in Scotland, and more recently in the moors round Oakmere, in Cheshire, and the same or a nearly allied species in Antrim County, Ireland. *Fl. summer.*



Fig. 1173.

XVII. **AIRA.** AIRA.

Very near *Oat* in all essential characters, but the spikelets are much smaller, usually with two flowers only, or rarely a single one, the flowering glumes thinner and more scarious, not projecting beyond the outer glumes, and the hair-like awn on their back much shorter than in *Oat*.

The species are few, chiefly European and north Asiatic, a very few extending into North America, or reappearing in the southern hemisphere.

Panicle very loose, with capillary, spreading branches.

Stems 2 to 4 feet high. Leaves in large tufts, flat and rough.

Awns shorter than the glumes 1. *Tufted A.*

Stems 1 to $1\frac{1}{2}$ feet. Leaves rolled in on the edges. Awns projecting from the outer glumes 2. *Wavy A.*

Stems 4 to 6 inches. Leaves fine and short. Awns shortly protruding 5. *Silvery A.*

Panicle dense and narrow. Stems 3 to 6 inches.

Spikelets about 2 lines long. Awns thickened at the top,
shorter than the outer glumes 3. *Grey A.*

Spikelets rather more than 1 line. Awn hair-like, shortly
protruding 4. *Early A.*

1. Tufted Aira. *Aira cæspitosa*, Linn. (Fig. 1174.)

(Eng. Bot. t. 1453.)

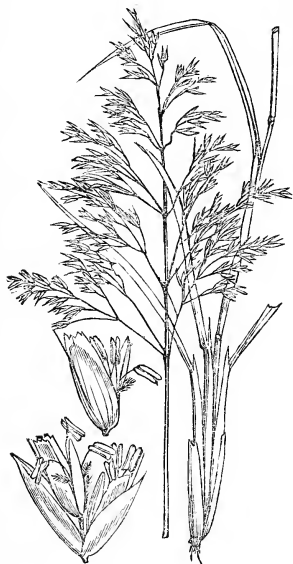


Fig. 1174.

A tall perennial, forming large, dense tufts, with rather stiff, flat leaves, very rough on the upper surface. Stems 2 to 4 feet, bearing an elegant panicle 6 inches to near a foot long, with spreading, slender, almost capillary branches. Spikelets silvery-grey or purplish, about $1\frac{1}{2}$ lines long. Outer glumes rather unequal, lanceolate and pointed. Flowering glumes scarcely projecting from the outer ones, minutely toothed or jagged at the top, with a fine hair-like awn inserted near their base, and not so long as the glume itself.

In moist, shady places, throughout Europe and Russian Asia, from the Mediterranean to the Arctic regions, and in North America. Abundant in Britain. *Fl. summer.* The *alpine A.* (*A. alpina*, Brit. Fl., *A. levigata*, Eng. Bot. t. 2102) is a mere variety, which in its least altered form only differs in its lower stature, with shorter leaves, with the glumes more or less enlarged, the awn adhering to it so much the higher as the glume is more altered. In the commoner state the whole panicle is *viviparous*, all the glumes being more or less elongated and foliaceous, without awns, and containing only very imperfect flowers or none at all. These varieties are frequent at considerable elevations, or at high latitudes, and not uncommon in the higher mountains of Scotland.

2. Wavy Aira. *Aira flexuosa*, Linn. (Fig. 1175.)

(Eng. Bot. t. 1519.)

A much smaller and more slender plant than the ordinary form of the *tufted A.*, from 1 to $1\frac{1}{2}$ feet high, with very narrow leaves, rolled

inwards on the edges, and almost subulate. Panicle spreading, but not above 2 or 3 inches long; the spikelets much fewer than in the *tufted A.*, but longer, being usually 2 to 3 lines long, very shining, with the fine, hair-like awns protruding beyond the glumes.

On heaths and hilly pastures, throughout Europe and Russian Asia, excepting some of the southern districts, in North America, and in Antarctic South America. Generally distributed over Britain. *Fl. summer.*

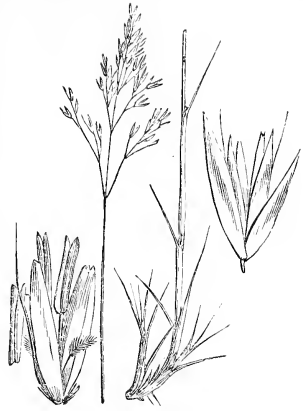


Fig. 1175.

3. Grey Aira. *Aira canescens*, Linn. (Fig. 1176.)

(Eng. Bot. t. 1190. *Corynephorus*, Bab. Man.)

A small, tufted perennial, of a glaucous or slightly purplish tinge, seldom above 6 inches high, with fine convolute leaves. Panicle dense and narrow, 1 to 2 inches long. Spikelets about 2 lines long, the outer glumes pointed, quite concealing the small flowering ones. These are remarkable for their awns, which are jointed in the middle, with a tuft of minute hairs at the joint, and slightly thickened towards the top, the whole awn not projecting beyond the outer glumes.

In sandy situations, in central and southern Europe, extending eastward to the Caucasus, and northward to southern Scandinavia. In Britain, only known for certain on the sandy seacoasts of Norfolk and Suffolk, and in the Channel Islands. *Fl. summer.*



Fig. 1176.

4. Early Aira. *Aira præcox*, Linn. (Fig. 1177.)

(Eng. Bot. t. 1296.)

A slender, densely tufted annual, 3 to 6 inches high, with short, very



Fig. 1177.

fine leaves. Panicle contracted, $\frac{1}{2}$ to 1 inch long. Spikelets rather more than a line long, the outer glumes very scarious. Flowering glumes small, cleft at the top, and slightly hardening, as in *Oat*; the short, hair-like awns shortly protruding beyond the outer glumes.

In sandy and hilly pastures, in central and southern Europe, and western Asia, extending into Scandinavia, but not far to the north. Generally spread over Britain, to the northern extremity of Scotland. *Fl. spring.*

5. Silvery Aira. *Aira caryophyllea*, Linn. (Fig. 1178.)

(Eng. Bot. t. 812. *Hair-grass.*)



Fig. 1178.

A slender, graceful, tufted annual, seldom above 6 inches high, with short, fine leaves, as in the *early A.*, but the panicle is loose and spreading, with long, capillary branches, usually in threes, often occupying half the whole height of the plant. Spikelets and glumes as in the *early A.*

In sandy and hilly pastures, with the same area as the *early A.*, and fully as common in Britain. *Fl. summer, rather early.*

XVIII. OAT. AVENA.

Spikelets several-flowered (usually with 3 to 5 flowers, rarely more, or 2 only), in a loose panicle. Glumes scarious, at least at the top;

the outer empty ones lanceolate and tapering to a point; the flowering ones smaller, 2-cleft at the top, each lobe tapering into a point, with a long, twisted, and bent awn on the back of the glume. The terminal glume of the spikelet often small and empty or rudimentary. Axis of the spikelet hairy under the flowering glumes.

A considerable genus, widely spread over the temperate and colder regions of both hemispheres, or in the higher mountains within the tropics.

Annual. Spikelets hanging, 8 to 10 lines long 1. *Wild O.*

Perennial. Spikelets erect or spreading.

Spikelets about 6 lines long 2. *Perennial O.*

Spikelets about 3 lines long 3. *Yellow O.*

1. Wild Oat. *Avena fatua*, Linn. (Fig. 1179.)

(Eng. Bot. t. 2221.)

An erect glabrous annual, 2 to 3 feet high, with a loose panicle of large spikelets, hanging from filiform pedicels of unequal length, arranged in alternate bunches along the main axis. Outer glumes nearly $\frac{3}{4}$ inch long, pale-green or purplish, tapering to a thin, scarious point. Flowering glumes 2 or 3, scarcely so long as the outer ones, of a firm texture at the base, and covered outside with long, brown hairs, thin and cleft at the top, each lobe tapering into a short point. Awn fully twice as long as the spikelet, twisted at the base, abruptly bent about the middle.

A common weed of cultivation in all corn countries, and generally confined to cornfields, so that its origin is as yet doubtful, but probably a native of the east Mediterranean region. Abundant in Britain. *Fl. with the corn.* A variety with the flowering glumes larger



Fig. 1179.

and more like the outer ones, hairy only below the middle, and terminating in 2 almost awn-like points, has been distinguished under the name of *A. strigosa* (Eng. Bot. t. 1266), and it is said that the cultivated Oat is but a variety of the same species, readily degenerating into the wild form.

2. Perennial Oat. *Avena pratensis*, Linn. (Fig. 1180.)

(Eng. Bot. t. 1204.)



Fig. 1180.

An erect perennial, with a tufted or shortly creeping rootstock, 1 to 1½ feet high with narrow leaves in dry pastures, but in rich mountain meadows attaining often 3 feet high, the leaves then broader, with much flattened sheaths. Panicle either slightly compound or reduced to a simple raceme. Spikelets erect, usually 3- or 4-flowered, glabrous and shining. Glumes all scarious at the top; the outermost empty one about 6 lines long, tapering to a point; the second similar but rather longer; the flowering ones gradually smaller, shortly cleft at the point, with an awn on the back fully twice their length.

In meadows and pastures, especially in hilly districts, throughout Europe and Russian Asia, except the extreme north.

Widely distributed over Britain, but not

very common. *Fl. summer, rather early.* Luxuriant mountain specimens, with more or less flattened sheaths to the leaves, have been distinguished as a species, under the name of *A. alpina* (*A. planiculmis*, (Eng. Bot. t. 2141), or, when very luxuriant, as *A. planiculmis* (Eng. Bot. Suppl. t. 2684). A more marked variety, not uncommon in dry, limestone districts, is generally distinguished as the *downy O.* (*A. pubescens*, Eng. Bot. t. 1640). It has the leaf-sheaths more or less downy, rather smaller spikelets, and the hairs on the axis of the spikelet between the florets much longer.

3. Yellow Oat. *Avena flavescens*, Linn. (Fig. 1181.)(Eng. Bot. t. 952. *Trisetum*, Bab. Man.)

An erect perennial, 1 to 2 feet high. Panicle oblong, 3 to 5 inches long, with slender, somewhat spreading branches and pedicels. Spikelets erect, shining, and often of a yellowish hue, not half the size of those of the *perennial O.* Glumes all scarious, the 2 outer empty ones very unequal. Flowering glumes usually 4 or 5, cleft into 2 points; the awn twisted and bent as in the last two species, but short, and very fine and hair-like.

In rather dry meadows and pastures, in temperate and southern Europe and Russian Asia, extending northward into southern Scandinavia. Frequent in England and Ireland, much less so in Scotland. *Fl. summer.* Like the *perennial O.*, it varies in the glabrous or hairy leaf-sheaths, and in the length of the points of the glumes.



Fig. 1181.

XIX. FALSE-OAT. ARRHENATHERUM.

A single species, separated from *Oat* as having the lower flower of each spikelet male only. At the same time, a minute rudimentary prolongation of the axis above the upper flower shows its general affinity with the *Poæaceæ*, not with the *Panicaceæ*, to which it might be technically referred.

1. Common False-Oat. *Arrhenatherum avenaceum*, Beauv.
(Fig. 1182.)

(*Holcus*, Eng. Bot. t. 813.)

An erect grass 2 or 3 feet in height, perennial but not forming large tufts. Leaves few and flaccid. Panicle narrow and loose, 6 or 8 inches long, spreading only whilst the flowers are open. Spikelets 3 to 4 lines long, 2-flowered, the 2 outer empty glumes thin and pointed, the second nearly as long as the flowers, the outermost rather shorter. The lowest flowering glume has a fine bent awn on the middle of the



Fig. 1182.

back about twice its own length, and contains stamens only; the upper flower is perfect, with a minute awn near the top of the glume or none at all.

In meadows, hedges, and thickets, throughout Europe and western Asia, except the extreme north. Common in Britain. *Fl. summer.*

XX. **HOLCUS.** HOLCUS.

Panicle somewhat open, but with numerous crowded spikelets, all 2-flowered; the upper flower male only, its glume bearing a short awn; the lowest hermaphrodite, its glume usually awnless. Outer glumes boat-shaped, compressed, enclosing the flowers. Axis of the spikelet without hairs.

A genus limited by most botanists to the two European species, allied on the one hand to *Digraphis*, from which it differs in the presence of an upper male flower and the want of the rudimentary scales below the perfect one; on the other to *False Oat*, but with a different habit, and the male flower above, not below, the perfect one.

Outer glumes about 2 lines long, rather obtuse, concealing the

awn 1. *Common H.*

Outer glumes near 3 lines long, very pointed, the awn project-

ing beyond them 2. *Soft H.*

1. **Common Holcus.** *Holcus lanatus*, Linn. (Fig. 1183.)

(Eng. Bot. t. 1169.)

A perennial Grass, with a creeping rootstock and ascending stems, 1 to 2 feet high, more or less clothed, as well as the leaves, with a very short down, which gives to the whole plant a pale, soft appearance.

Panicle 2 to 3 inches long, of a pale whitish colour or sometimes reddish. Outer glumes about 2 lines long, obtuse, but often bearing a short point just below the tip. Lowest flowering glume awnless, smooth and shining; the upper one thinner, its awn seldom reaching the length of the outer glumes.

In meadows, pastures, and waste places, throughout Europe and probably Russian Asia, except the extreme north, One of the commonest British Grasses. *Fl. all summer.*



Fig. 1183.

2. Soft *Holcus*. *Holcus mollis*, Linn. (Fig. 1184.)

(Eng. Bot. t. 1170.)

Very near the *common H.*, and by some considered as a mere variety. It is not generally so downy, although the hairs on the joints are rather more conspicuous, the spikelets are larger, the outer glumes taper to a fine point, and the awn of the upper flowering glume usually projects beyond the outer ones.

In similar situations with the *common H.*, and with nearly the same geographical area, but much less common. Generally distributed over Britain, but certainly not abundant, and in some parts very rare. *Fl. summer.*



Fig. 1184.

XXI. *CYNODON*. *CYNODON*.

Spikelets 1-flowered, awnless, sessile along one side of the simple, spike-like branches of the panicle, which all proceed from nearly the

same point, so as to appear digitate. At the base of the palea is a small bristle or prolongation of the axis, sometimes bearing a very minute rudimentary glume.

A genus of very few species, perhaps all varieties of a single one, readily known by the digitate spikes from all British Grasses except the *fingered* and the *glabrous* *Panicums*, and from them by the spikelets arranged singly, not in pairs, along the spikes.

1. Creeping Cynodon. *Cynodon Dactylon*, Pers.

(Fig. 1185.)

(*Panicum*, Eng. Bot. t. 850.)



Fig. 1185.

south-western coasts of England. *Fl. summer and autumn.*

A low, prostrate Grass, often creeping and rooting to a great extent; the flowering stems shortly ascending, with short leaves of a glaucous green. Panicle of 3 to 5 slender spikes, each 1 to $1\frac{1}{2}$ inches long. Spikelets less than a line long; the outer glumes nearly equal, open, narrow, and pointed. Flowering glume rather longer and much broader, becoming hardened when in fruit, smooth on the sides, rather rough on the keel and edges.

In cultivated and waste places, especially near the sea, very common in southern Europe and in all hot countries, extending more sparingly into northern France and central Germany. In Britain, only in a few stations on the

XXII. **SPARTINA.** SPARTINA.

Spikelets 1-flowered, much flattened, and awnless, sessile along one side of the simple branches of a long, spike-like panicle. Glumes long and narrow, strongly keeled, the palea as long as or longer than the flowering glume.

A small genus, chiefly American, and almost confined to seacoasts.

1. Cord *Spartina*. *Spartina stricta*, Sm. (Fig. 1186.)

(Dactylis, Eng. Bot. t. 380. Cordgrass.*)

A stiff, erect Grass, with a creeping rootstock, and rather short, erect leaves, flat, excepting at the end, when fresh, the edges always rolled inwards when dry. Panicle 3 or 4 inches long, consisting of from 2 to 4 erect, spike-like branches; spikelets arranged alternately in two rows along these branches, sessile in a groove on the axis, all erect but turning to one side, each spikelet 6 to 8 lines long. Glumes thin but stiff, pointed or rather obtuse; the first empty one 3 or 4 lines long; the second about half an inch, and often hairy; the flowering glume similar but scarcely so long; the palea again rather longer. The smell of the whole plant is strong and disagreeable.



Fig. 1186.

In muddy salt-marshes, along the shores of the Atlantic; common in North America, less so in western Europe, and very local on the Mediterranean as well as the North Sea. In Britain, only on the southern and eastern coasts of England. *Fl. summer and autumn*. A luxuriant variety, with long leaves, long slender spikes, and nearly glabrous glumes, has been described as a species under the names of *S. glabra* or *S. alterniflora* (Eng. Bot. Suppl. t. 2812), but in North America, where it is frequent, it passes gradually into the more common form. In Britain, this variety has been found on the coast of Hampshire near Southampton.

XXIII. LEPTURUS. LEPTURUS.

Spikelets 1-flowered (or, in some exotic species, 2-flowered) awnless, inserted singly in notches on alternate sides of a simple slender spike, the axis jointed at each notch. Outer glumes 2, hard and ribbed; flowering glumes very thin. Stamens 3 and styles 2, as in most genera of *Grasses*.

A genus of very few species, chiefly seacoast plants, widely dispersed over the greater part of the globe.

* The name of *Cordgrass* would, however, be more appropriately restricted to the south European *Lygeum Spartum*.

1. Curved Lepturus. *Lepturus incurvatus*, Trin.
(Fig. 1187.)

(*Rottboellia*, Eng. Bot. t. 760.)



Fig. 1187.

An annual, decumbent and much branched at the base; the flowering stems curved upwards or erect, a few inches, or, when very luxuriant, nearly a foot high, with short fine leaves, the uppermost one close under the flowers. Spike 2 to 4 inches long, usually curved; the spikelets imbedded as it were in the axis, which breaks off readily at every notch. Outer glumes about 2 lines long, stiff and pointed, with strong green ribs; the flowering glume and palea rather shorter, of a very delicate transparent texture.

In salt-marshes and maritime sands and pastures, on the western coasts of Europe; abundant all round the Mediterranean, extending eastward to the Caspian and northward to the English Channel. In Britain, it occurs on the shores of England, Ireland, and southern Scotland, but is not generally common. *Fl. summer.*

XXIV. **NARD.** NARDUS.

A single species, differing from all other genera of British *Grasses* in the very simple structure of its spikelets.

1. Common Nard. *Nardus stricta*, Linn. (Fig. 1188.)

(Eng. Bot. t. 290, *Matgrass*.)

A densely tufted, erect, wiry perennial, 6 inches to near a foot high. Leaves fine, but very stiff and bristle-like. Spikelets 1-flowered, sessile, alternately arranged in 2 rows on one side of an erect, slender, simple spike, often assuming a purplish hue. Each spikelet has a single

narrow glume, 3 or 4 lines long, ending in a fine point, and enclosing a palea, 3 stamens, and a simple style.

On moors, heaths, and hilly pastures, in northern and Arctic Europe and Russian Asia, and in the mountains of central and southern Europe to the Caucasus. Common in Britain. *Fl. summer.*

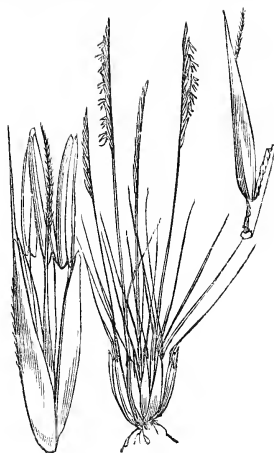


Fig. 1188.

XXV. LYMEGRASS. ELYMUS.

Spikelets 2- to 4-flowered, awnless, sessile in pairs (or, in exotic species, 3 or 4 together) in the notches of a simple spike.

A small genus, spread over the temperate and cooler parts of the northern hemisphere, differing from *Barley* in that all the spikelets contain more than one flower.

1. Sand Lyme-grass. *Elymus arenarius*, Linn. (Fig. 1189.)

(Eng. Bot. t. 1672. *Lymegrass.*)

A stiff, glaucous perennial, 2 to 4 feet high, with a long creeping rootstock. Leaves stiff, rolled inwards on the edges, ending in a hard point. Spike sometimes rather dense, 3 to 4 inches long, sometimes lengthening to 8 or 9 inches; with the spikelets in rather distant pairs, each containing 3 or 4 flowers. Glumes lanceolate, stiff, downy or rarely glabrous; the outer ones 8 or 9 lines long, and very pointed; the flowering ones gradually shorter, broader, and less pointed.

In maritime sands, common in the temperate and colder regions of the northern hemisphere, more local on the Mediterranean and in hotter climates, and occurring occasionally in inland central Europe. Extends all round the British Isles, but more frequent in the north than in the

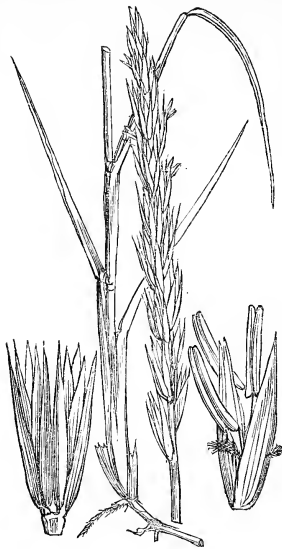


Fig. 1189.

south. *Fl. summer*. A singular variety, with the spike much elongated, the spikelets distant, and the glumes often enlarged, in which also the whole spike is abruptly bent down, has been distinguished as a species, under the name of the *pendulous E.* (*E. geniculatus*, Eng. Bot. t. 1586). It is occasionally met with on the coasts of Holland and Scandinavia, and is said to have been gathered formerly on the Thames below Gravesend.

XXVI. **BARLEY.** HORDEUM.

Spikelets 3 together, sessile on alternate notches of a simple spike, 1 or 2 of them consisting each of 2 glumes, either empty or with male or rudimentary flowers, the 2 or 1 others containing each 1 perfect flower; the empty glumes of the 3 spikelets often reduced to mere awns, and forming a kind of involucre round the flowering glume.

A genus of few species, dispersed over the temperate regions of both hemispheres, chiefly in maritime districts, and rare in the tropics. The origin of the 2 or 3 cultivated species has not been as yet satisfactorily made out.

Flowers of the 2 lateral spikelets perfect; of the central one

male, or rudimentary, or none 1. *Wood B.*

Flowers of the central spikelet perfect; of the lateral ones male, or rudimentary, or none.

Outer glumes of all the spikelets awn-like from the base . . . 2. *Meadow B.*

Outer glumes of the central spikelet lanceolate, and ciliate at the base; of the others awn-like from the base . . . 3. *Wall B.*

Outer glumes of all the spikelets slightly dilated at the base, not ciliate, and one of each lateral spikelet broader than the rest 4. *Sea B.*

1. Wood Barley. *Hordeum sylvaticum*, Huds.

(Fig. 1190.)

(*Elymus europæus*, Eng. Bot. t. 1317.)

An erect perennial, about 2 feet high, with flat leaves, usually hairy on the sheaths. Spike cylindrical, not very dense, about 3 inches long. The central spikelet of each notch is reduced to 2 narrow-linear glumes, either quite empty or rarely containing a rudimentary or male flower; the 2 lateral spikelets have each 1 perfect flower, and sometimes a second, either rudimentary or male; the outer glumes like those of the central spikelet, but rather broader and longer, and placed side by side; the flowering glume shorter, but terminating in a long awn.

In woods and thickets, in central and southern Europe, extending eastward to the Caucasus and northward to southern Scandinavia. In Britain, not rare in some of the midland and northern counties of England, but not found in Ireland or Scotland. *Fl. summer.*



Fig. 1190.

2. Meadow Barley. *Hordeum pratense*, Huds.

(Fig. 1191.)

(Eng. Bot. t. 409.)

An erect or decumbent annual or perennial, often 2 feet high, and tufted or bulbous at the base. Leaves glabrous and rather narrow. Spike $1\frac{1}{2}$ to 2 inches long, close and cylindrical. To each notch are 3 pairs of awn-like, rough glumes; within the central pair is a flowering glume, lanceolate, but completely rolled round the flower, and tapering into an awn as long as itself; within each of the 2 lateral



Fig. 1191.

3. Wall Barley. *Hordeum murinum*, Linn. (Fig. 1192.)

(Eng. Bot. t. 1971.)



Fig. 1192.

pairs is usually an inner glume smaller than the central one, either empty or enclosing a male or rudimentary flower.

In moist meadows, and pastures, in central and southern Europe, extending eastward all across Russian Asia and northward to southern Scandinavia. Frequent in England and Ireland, but scarcely extending into Scotland. *Fl. early summer.*

A rather coarse, tufted Grass, the stems decumbent at the base, 1 to 2 feet long. Leaves often hairy. Spike dense and cylindrical, 3 or 4 inches long, thickly beset with the long rough awns. Outer glumes of the 3 spikelets all awn-like, but those of the central spikelet somewhat broader at the base and ciliate. Inner glume of each spikelet lanceolate and rolled inwards at the base, ending in a long awn; that of the central spikelet enclosing a perfect flower and a short awn-like empty glume at the back of the palea; those of the lateral ones empty or with a very imperfect male flower.

In waste places, on roadsides, etc., in central and southern Europe and western Asia, extending northwards to southern Scandinavia, and now naturalized in many parts of the world. Frequent in the greater part of England and Ireland, but rare or local in Scotland. *Fl. all summer.*

4. Sea Barley. *Hordeum maritimum*, With. (Fig. 1193.)

(Eng. Bot. t. 1205.)

Very near the *Wall B.*, but smaller and somewhat glaucous, the spikes smaller, with shorter awns, the 3 pairs of outer glumes all lanceolate at the base but not ciliate, and one of each of the lateral pairs a little broader than the others.

On the seacoasts of western Europe, and all round the Mediterranean, extending northward to Denmark, but not into the Baltic. Abundant on several of the English coasts, but a very doubtful inhabitant of Scotland or Ireland. *Fl. summer.*



Fig. 1193.

XXVII. **TRITICUM.** TRITICUM.

Spikelets several-flowered, closely sessile, and single in each notch of a simple spike, the side of the spikelet or edge of the glumes being next the axis of the spike. Outer empty glumes 2, similar to the flowering ones.

To this genus belong the cultivated *Wheats*, all annuals, of uncertain origin, by some said to be indigenous in some little-known regions of western Asia, by others believed to be altered forms of the common south European and west Asiatic Grasses known under the generic name of *Ægilops*. The British wild species are all perennials, and form part of a different section, distinguished by some as a separate genus, under the name of *Agropyron*, which should be adopted if it be definitively ascertained that the annual *Wheats* are identical with *Ægilops*.

Rootstock creeping 1. *Couch T.*
No creeping rootstock 2. *Fibrous T.*

1. **Couch Triticum.** *Triticum repens*, Linn. (Fig. 1194.)(Eng. Bot. t. 909. *Couchgrass*.)

A perennial, with an extensively creeping rootstock, and stiff, ascending or erect stems, 1 to 2 or even 3 feet high; the whole plant varying from a bright green to a pale glaucous colour. Spikelets 8 to



Fig. 1194.

10 or more, at regular distances on alternate sides of a spike varying from 2 or 3 inches to twice that length, each one containing 5 or 6 flowers. Glumes all alike in shape, narrow and stiff, marked with 5 or more nerves, and usually pointed or terminating in an awn, sometimes exceedingly short, sometimes as long as the glume itself; the outer empty glume about 4 lines long; the flowering ones gradually shorter, with less prominent nerves; the terminal one usually small and empty or quite rudimentary.

In fields and waste places, throughout Europe and Russian Asia, from the Mediterranean to the Arctic regions, and in North and South America. Abundant in Britain. *Fl. summer*. The *Rush T.* (*T. junceum*, Eng. Bot. t. 814, and *T. laxum*, Brit. Fl.)

appears to be merely a maritime variety of the same species, much stiffer and more glaucous, with the leaves almost pungent, and the glumes often obtuse. It is frequent on seacoasts throughout the range of the common *couch T.*, and has been often observed to pass gradually into it.

2. Fibrous Triticum. *Triticum caninum*, Huds. (Fig. 1195.) (Eng. Bot. t. 1372.)

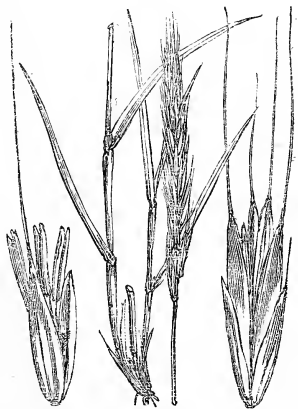


Fig. 1195.

In the structure of the spikelets and their arrangement, this species closely resembles the *couch T.*, but the stems are tufted, without any creeping rootstock, more leafy, and not so glaucous. Glumes rather thinner, with 5 very prominent ribs, and terminating in a rather long awn; the outer empty ones usually smaller than the flowering ones, with shorter awns, and often only 3 ribs.

In woods and shady places, in Europe and Russian Asia from the Mediterranean to the Arctic regions, and in North America. Generally distributed over Britain, but not very common. *Fl. summer*.

XXVIII. **LOLIUM.** LOLIUM.

Spikelets several-flowered, closely sessile, and single in each notch of the simple spike, the edge of the spikelet (or the backs of the glumes of one row) next the axis of the spike. One or rarely 2 outer glumes empty, differing but little from the flowering ones.

A genus of very few species, natives of the temperate regions of the northern hemisphere; some of them found also, either indigenous or perhaps introduced, in the southern hemisphere, and even within the tropics.

Outer glumes shorter than the spikelet. Awns short or none 1. *Ryegrass* L.
 Outer glume as long as or longer than the spikelet. Some of
 the glumes with awns as long as themselves 2. *Darnel* L.

1. **Ryegrass** *Lolium*. *Lolium perenne*, Linn. (Fig. 1196.)

(Eng. Bot. t. 315, *L. linicola*, Suppl. t. 2955, and *L. multiflorum*, Brit. Fl.)

An erect or slightly decumbent Grass, either annual or often lasting for several years, 1 to 2 feet high, leafy only in the lower part. Spike 6 inches to a foot long, the spikelets at a considerable distance from each other. Outer glume of the lateral spikelets empty, stiff, and strongly nerved, usually much larger than the others, yet seldom attaining 6 lines and never so long as the whole spikelet. Flowering glumes 8 to 16 or even more, obtuse or pointed, or sometimes ending in a short awn. In the terminal spikelet the second glume is usually empty, and sometimes also in the lateral spikelets.

In meadows, pastures, and waste places, throughout Europe and Russian Asia, except the extreme north, and naturalized in other parts of the world. Abundant in Britain. *Fl. the whole*

season. It varies much in duration, and in the precise shape and proportion of the glumes, as well as in the presence or absence of awns. The *Italian Ryegrass* (*L. italicum*, Braun), now much imported from the Continent, is a variety raised by cultivation, most probably from

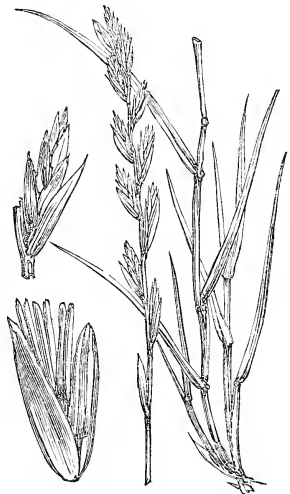


Fig. 1196.

seeds originally exported from England. In rich meadows abnormal varieties, or rather, luxuriant states occur occasionally with a branched spike, or with an increased number of variously deformed empty glumes.

2. Darnel *Lolium*. *Lolium temulentum*, Linn. (Fig. 1197.)

(Eng. Bot. t. 1124, and *L. arvense*, t. 1125.)



Fig. 1197.

Closely allied to the *Ryegrass L.*, but the root is always annual, the outer glume of the spikelets usually as long as the spikelet itself, the flowering glumes shorter and broader than in the *Ryegrass L.*, and some of them at least have an awn longer than themselves. In fields and waste places, in central and southern Europe, and central Asia, extending more or less into northern Europe as a weed of cultivation, and as such generally dispersed over Britain, although not common. *Fl. summer.*

XXIX. FALSE-BROME. BRACHYPODIUM.

Spikelets many-flowered, long, in a single spike, as in *Triticum*, but not so much flattened as in the perennial species of that genus, and not quite so closely sessile, the axis of the spike not being indented to receive them, yet not so distinctly stalked as in *Fescue*.

A genus of very few species, chiefly from the temperate regions of the old world, and intermediate, as it were, between *Triticum*, *Fescue*, and *Brome*, with one or other of which genera they have often been united.

Awns as long as or longer than the flowering glumes. Spikelets

usually drooping 1. *Slender F.*

Awns shorter than the flowering glumes. Spikelets erect or

nearly so 2. *Heath F.*

1. Slender False-Brome. *Brachypodium sylvaticum*, Beauv. (Fig. 1198.)

(*Bromus*, Eng. Bot. t. 729.)

A rather slender, erect Grass, 2 to 3 feet high, with a perennial tuft, and

slightly creeping rootstock. Leaves flat, and rather long. Spikelets usually 6 or 7, in a loose spike, more or less drooping, or rarely erect, each one attaining an inch or even more in length, nearly cylindrical when young, but flattened when in fruit, containing from 8 to twice that number of flowers. Glumes glabrous or pubescent, the outer ones pointed, the flowering ones ending in an awn, usually as long as or longer than the glume itself. Palea fringed with a few hairs on the edges.

In woods, hedges, and thickets, throughout Europe, and central and Russian Asia, except the extreme north. Common in England and Ireland, more scarce in the Scotch Highlands. *Fl. summer.*



Fig. 1198.

2. Heath False-Brome. *Brachypodium pinnatum*, Beauv. (Fig. 1199.)

(*Bromus*, Eng. Bot. t. 730.)

Perhaps a mere variety of the *slender F.*, growing in more open situations. The rootstock is more creeping, the spikelets more erect, the flowering glumes rather smaller, and more open, and the awn is very much shorter.

In pastures and stony wastes, with nearly the same geographical range as the *slender F.*, but not extending so far north, and more common in southern and eastern Europe. In Britain, scattered over the eastern and central counties of England, but unknown in Scotland or Ireland. *Fl. summer.*



Fig. 1199.

XXX. **BROME.** BROMUS.

Spikelets several-flowered, rather large, erect or drooping, in a branched, loose, or compact panicle. Outer glumes unequal, usually keeled and awnless. Flowering glumes longer, rounded on the back, scarious at the edges, with an awn inserted just below the notched or cleft summit. Palea ciliate on the nerves. Ovary usually hairy, the style inserted on one side of the summit.

A considerable genus, widely spread over the northern hemisphere, chiefly in the old world, with a few American or southern species. It is also a natural one if made to include the *tall B.*, referred by some to *Fescue* on account of the glabrous ovary and more central style.

- Flowering glumes oblong, turgid. Outer ones distinctly
nerved 6. *Field B.*
- Flowering glumes narrow-lanceolate. Outer ones obscurely
nerved.
- Flowering glumes about 3 lines long. Ovary glabrous . . 7. *Tall B.*
- Flowering glumes 5 lines long or more. Ovary hairy.
- Awns shorter or not longer than the glumes. Leaf-sheaths
with long hairs.
- Panicle loose and drooping 2. *Hairy B.*
- Panicle compact and erect 1. *Upright B.*
- Awns longer than the glumes. Leaves softly downy or
glabrous.
- Panicle loose and drooping 3. *Barren B.*
- Panicle compact and erect.
- Spikelets, together with the awns, more than 3 inches
long 4. *Great B.*
- Spikelets with the awns not 2 inches long 5. *Compact B.*

1. Upright Brome. *Bromus erectus*, Huds. (Fig. 1200.)

(Eng. Bot. t. 471.)

An erect perennial, 2 feet high or more, with a slightly creeping rootstock. Leaves narrower than in most *Bromes*, especially the radical ones, with a few long hairs on their sheaths. Panicle about 3 to 5 inches long, much more compact than in the *barren B.*, the branches erect or nearly so. Spikelets not numerous, $\frac{1}{2}$ to $1\frac{1}{2}$ inches long, containing 6 to 10 or even more flowers. Flowering glumes lanceolate,

with closely appressed hairs on the back, the lateral nerves scarcely prominent, the awn straight, and scarcely half its length.

In fields and waste places, in temperate and southern Europe to the Caucasus, extending northward into southern Scandinavia. In Britain, chiefly in southern and eastern England, very local in Wales, Ireland, and Scotland.

Fl. summer.

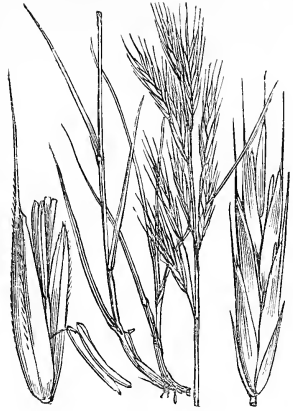


Fig. 1200.

2. Hairy Brome. *Bromus asper*, Linn. (Fig. 1201.)

(Eng. Bot. t. 1172.)

An annual, or sometimes perennial, 3 to 5 or even 6 feet high. Leaves long and flat, with long, spreading or reflexed hairs on their sheaths. Panicle loose, with long, drooping branches, bearing a few loose spikelets, each above an inch long, containing 6 to 10 or more flowers. Flowering glumes nearly cylindrical, slightly hairy or glabrous, with a straight, fine awn, shorter than the glume itself.

In hedges and thickets, and on the edges of woods, in temperate and southern Europe, extending eastward to the Caucasus, and northward to southern Scandinavia. Frequent in England, Ireland, and the lowlands of Scotland.

Fl. summer.



Fig. 1201.

3. Barren Brome. *Bromus sterilis*, Linn. (Fig. 1202.)

(Eng. Bot. t. 1030.)

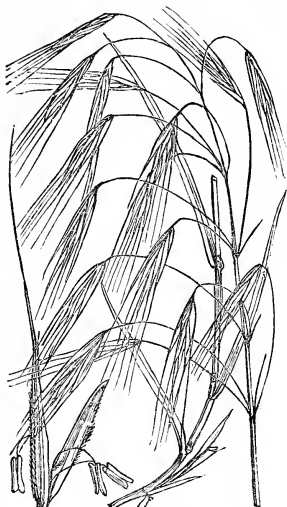


Fig. 1202.

An erect annual or biennial, 1 to 2 feet high or rather more; the leaves softly downy, but less so than in the *field B.* Panicle 6 inches long or more with numerous more or less drooping branches, many of them as long as the spikelets or longer. Spikelets linear-lanceolate, with 6 to 8 or more flowers, attaining more than 2 inches in length, including their awns. Flowering glumes rough on the back, distinctly 7-nerved, with a straight awn much longer than the glume itself.

In waste places, on waysides, etc., throughout Europe and Russian Asia, except the extreme north. Abundant in England, Ireland, and the Lowlands of Scotland. *Fl. summer, commencing early.*

4. Great Brome. *Bromus maximus*, Desh. (Fig. 1203.)

(Eng. Bot. t. 2820.)



Fig. 1203.

Very near the *barren B.*, but the panicle is more erect and compact, only a few of the branches attaining the length of the spikelets without their awns, and the flowering glumes are larger and broader, with very long awns, the whole spikelet, including the awns, being often $3\frac{1}{2}$ inches long.

A native of the Mediterranean region, which appears to have established itself in Jersey. *Fl. early summer.*

5. Compact Brome. *Bromus madritensis*, Linn. (Fig. 1204.)

(*B. diandrus*, Eng. Bot. t. 1006.)

A much smaller plant than the *barren B.*, seldom above a foot high, less downy, and with narrower leaves. Panicle erect or nearly so, very compact, and often of a purplish tint, the branches much shorter than the spikelets. Awns as in the last two, longer than the flowering glumes; but the whole spikelet, including the awns, is seldom 2 inches long. The flowers have, like other *Bromes*, sometimes only 2 stamens.

On roadsides, and in waste places, throughout southern Europe, extending up the west coasts to the English Channel. In Britain, only in the southern counties of England, and in Tipperary county, Ireland. *Fl. early summer.*



Fig. 1204.

6. Field Brome. *Bromus arvensis*, Linn. (Fig. 1205.)

(Eng. Bot. t. 920 and t. 1984, *B. pratensis*, *B. commutatus*, and *B. patulus*, Brit. Fl. *Serrafalcus* (4 species), Bab. Man.)

An erect annual or biennial, varying much in size, from 1 to 2 or 3 feet high, more or less softly downy, or sometimes quite glabrous. Panicle sometimes small, slender, elongated or compact, and nearly erect, but more frequently more or less drooping, yet never so large nor so loose as in the *hairy B.* and the *barren B.*; and amidst all its variations, the species is always distinguished from the 4 preceding ones by its short, oblong or ovoid, turgid flowering glumes, 3 to 4 lines long, and more closely packed, giving a broader and fuller shape to the spikelet. Awn slender, usually about the length of the glumes, straight, or spreading when dry, but not in so marked a manner as in the south European *B. squarrosus*, said to have appeared occasionally in our corn-fields.



Fig. 1205.

In cultivated and waste places, meadows, and pastures, throughout Europe and Russian Asia, except the extreme north. Abundant in Britain. *Fl. the whole season, especially spring and early summer.* Many of the forms assumed by this ubiquitous species, difficult as they are to distinguish, and passing gradually one into another, have been universally recognized as species, although with characters very differently marked out by different authors. The most prominent among the British ones are :—

a. *Rye-like field B.* (*B. secalinus*, Eng. Bot. t. 1171.) A tall, corn-field variety, with a loose, more or less drooping panicle, the flowers not so closely imbricated, becoming quite distinct and spreading when in fruit, most of these differences arising from being cultivated with the corn.

b. *Soft field B.* (*B. mollis*, Eng. Bot. t. 1078.) One of the commonest forms, in open, waste places, with a more erect panicle, either short and compact, or long and slender, and the whole plant softly downy.

c. *Smooth Field B.* (*B. racemosus*, Eng. Bot. t. 1079.) Like the last variety, but much more glabrous.

d. *Many-flowered field B.* (*B. multiflorus*, Eng. Bot. t. 1884), includes either of the preceding varieties, when the flowers are more numerous than usual in the spikelet.

7. Tall Brome. *Bromus giganteus*, Linn. (Fig. 1206.)

(*Festuca*, Eng. Bot. t. 1820, and *F. triflora*, t. 1918.)



Fig. 1206.

An erect, glabrous perennial, 3 or 4 feet high, with a long, loose, more or less drooping panicle, much resembling the *hairy B.*, but known at once by the smaller spikelets and slender awns. The spikelets, without the awns, 7 or 8 lines long, and contain from 3 to 6 flowers. Outer glumes unequal, the lowest 1-nerved, the second 3-nerved. Flowering glumes lanceolate, almost nerveless, about 3 lines long; the fine awn fully twice that length, usually inserted a little below the tip, as in *Brome*. Ovary glabrous, as in *Fescue*.

In hedges and woods, over the greater part of Europe and Russian Asia, except the extreme north. In Britain, not generally so common as the *hairy B.*, and still less so in Scotland. *Fl. summer.*

XXXI. **FESCUE.** **FESTUCA.**

Spikelets several-flowered, usually numerous, in a compact or slightly spreading panicle (in one variety reduced to a simple spike). Outer glumes unequal, keeled. Flowering glumes lanceolate, convex on the back, pointed or tapering into an awn, scarcely scarious at the edges. Ovary glabrous, rarely downy, with the styles terminal.

A genus widely distributed over the temperate regions of the globe, and numerous in forms if not in species. It differs from *Poa* only in the longer, more pointed, or awned glumes; from *Brome* in the inflorescence, in the more terminal points or awns, the edges of the glumes less scarious and scarcely, if at all, extended beyond the commencement of the awn, as well as in the glabrous ovary and more terminal styles of most of the species.

Awns none, or not above a line long.

Leaves, at least the radical ones, subulate and almost cylindrical. Stem seldom 2 feet high 1. *Sheep's F.*

Leaves flat. Stems 2 to 6 feet high.

Spikelets 3- to 5-flowered. Outer glumes linear. Flowering glumes narrow 3. *Reed F.*

Spikelets 5- to 10-flowered. Outer glumes lanceolate.

Flowering glumes broadly lanceolate 2. *Meadow F.*

Awns as long as or longer than the glumes.

Panicle loose and spreading. Stem 3 to 4 feet *Tall Brome.*

Panicle one-sided, narrow and compact or spike-like.

Stems annual, under a foot high.

Outer glumes narrow, the lowest 1 to 2 lines, the second 2 to 3 lines long 4. *Rat's-tail F.*

Lowest glume a minute scale, the second lanceolate, 4 to 6 lines long 5. *One-glumed F.*

1. **Sheep's Fescue.** *Festuca ovina.* (Fig. 1207.)

(Eng. Bot. t. 585, *F. duriuscula*, t. 470, *F. caesia*, t. 1917, and *F. rubra*, t. 2056.)

A densely tufted or more rarely shortly creeping perennial, 6 inches to near 2 feet high. Leaves chiefly radical, very narrow, and almost cylindrical, the few stem ones more rarely flattened. Panicle rather compact and slightly one-sided, from $1\frac{1}{2}$ to 4 inches long. Spikelets smaller than in the *meadow F.*; the glumes narrower, glabrous or downy, very faintly nerved, and almost always bearing a fine point or awn about a line long.

In hilly pastures, most abundant in dry, open situations, more rarely in moist places, throughout Europe and central and Russian Asia, from the Mediterranean to the Arctic regions, and in North America and New Zealand. Abundant in Britain. *Fl. summer.* In mountain pastures it is very apt to become *viviparous*, the glumes becoming elon-



Fig. 1207.

gated and leaf-like, and this state has been considered as a species, under the name of *F. vivipara* (Eng. Bot. t. 1355). Besides which the following, among the British varieties, are sometimes ranked as species:—

a. *Common sheep's F.* Stems not a foot high, with dense tufts of subulate leaves. In dry, hilly pastures.

b. *Tall sheep's F.* (*F. duriuscula*). Taller but tufted, the radical leaves subulate, one or two stem ones usually flattened. In moister and more luxuriant pastures.

c. *Sand F.* (*F. sabulicola* or sometimes *F. rubra*). Rootstock more or less creeping, all the leaves subulate. In light sandy or loose stony places. In

maritime sands, sometimes above 2 feet high.

2. Meadow Fescue. *Festuca elatior*, Linn. (Fig. 1208.)



Fig. 1208.

A perennial, varying from about 2 to 4 or 5 feet in height, either tufted or with a shortly creeping rootstock. Leaves flat but varying much in breadth. Panicle sometimes reduced to a simple spike, with almost sessile, distant spikelets, more frequently branched, but always erect and narrow, from 5 or 6 inches to near a foot long. Spikelets 6 lines to near an inch long, containing from 5 to 10 or even more flowers. Flowering glumes, when the panicle is nearly simple, rather broad, scarious at the edge, scarcely pointed, and distinctly 5-ribbed; but the more the panicle is branched the narrower and more pointed are the glumes, with less distinct ribs, and sometimes with a distinct but exceedingly short awn.

In meadows and moist pastures, on banks and riversides, throughout Europe and Russian Asia, except the extreme north. Common in Britain. *Fl. summer, rather early.* The three most marked British forms, often

considered as species, but now generally admitted to be mere varieties, are the following:—

a. *Spiked meadow F.* (*F. loliacea*, Eng. Bot. t. 1821). Spikelets almost sessile, in a simple spike. Grows with the common form, always passing gradually into it.

b. *Common meadow F.* (*F. pratensis*, Eng. Bot. t. 1592). Panicle slightly branched but close. In meadows and pastures.

c. *Tall meadow F.* (*F. elatior*, Eng. Bot. t. 1593, *F. arundinacea*, Bab. Man.). A taller, often reed-like plant, with broader leaves, the panicle more branched and spreading. On banks of rivers, and in wet places, especially near the sea.

3. Reed Fescue. *Festuca sylvatica*, Vill. (Fig. 1209.)

(*F. calamaria*, Eng. Bot. t. 1005, and *F. decudua*, t. 2266.)

A tall, reed-like perennial, with rather broad, flat leaves, and a rather compact panicle, 4 to 6 inches long. Spikelets numerous, smaller even than in the *sheep's F.*, seldom containing more than 4 or 5 flowers. Outer glumes much narrower than in the two preceding species, and often almost subulate. Flowering glumes about 2 lines long, tapering into a fine point, but not distinctly awned.

In mountain woods, in central Europe, from central France and northern Italy to southern Scandinavia, and eastward to the Russian frontier. In Britain, thinly scattered over a large area, both in Great Britain and Ireland, more prevalent in northern than in southern England, but unknown in the north of Scotland. *Fl. summer.*



Fig. 1209.

4. Rat's-tail Fescue. *Festuca Myurus*, Linn. (Fig. 1210.)

(Eng. Bot. t. 1412 and *F. bromoides*, t. 1411. *F. sciuroides*, Bab. Man.)

A tufted annual, usually about a foot high. Leaves narrow and convolute as in the *sheep's F.* Panicle slender and one-sided, 2 to 6 inches long, contracted, sometimes spike-like or even reduced to a simple spike; the branches always short and erect. Spikelets of the size of those of the *sheep's F.*, but the glumes narrower, the outer ones very



Fig. 1210.

unequal, the flowering ones ending in an awn at least as long as themselves.

In waste places, on walls, roadsides, etc., in central and southern Europe, extending eastward to the Caucasus and northward into southern Scandinavia. In Britain, rather frequent in England and Ireland, less so in Scotland. *Fl. early summer*. There are two marked varieties often considered as species, the true *F. Myurus*, with a panicle of about 3 inches, the flowering glumes nearly as long as their awn, the lowest empty glume about 2 lines long, the second at least 3 lines, and both very pointed; and the *bromelike F. (F. bromoides)*, with the panicle much longer and more slender, the flowering glumes smaller, thinner, and much shorter than their awns, the outermost empty glume not line 1 long, the second about 2 lines.

In some localities, however, the two forms run much one into the other.

5. One-glumed Fescue. *Festuca uniglumis*, Soland.

(Fig. 1211.)

(Eng. Bot. t. 1430.)



Fig. 1211.

A tufted annual, with convolute leaves like the last, but seldom above 6 inches high, and the leaf-sheaths much looser. Panicle one-sided and spike-like, 2 inches long or rather more. Spikelets much crowded, on short, erect pedicels, thickened at the top. Outermost glume reduced to a minute almost microscopic scale; the second lanceolate, 4 to 6 inches long, scarious on the edges, ending in an awn-like point. Flowering glumes 3 or 4, rather shorter, but ending in an awn usually longer than themselves.

On sandy seacoasts, common round the Mediterranean, and extending up the shores of western Europe to the

English Channel. In Britain, on the coasts of Ireland, and western, southern, and south-eastern England. *Fl.* early summer.

XXXII. **COCK'S-FOOT.** DACTYLIS.

A single species, with all the characters of *Fescue*, except that the spikelets are densely crowded in thick, one-sided clusters, arranged in an irregular short spike or slightly branched panicle.

1. **Clustered Cock's-foot.** *Dactylis glomerata*, Linn.

(Fig. 1212.)

(Eng. Bot. t. 335.)

A coarse, stiff Grass, 1 to 2 feet high, the perennial stock forming at length dense tufts. Leaves flaccid, but rough on the edges. Clusters of spikelets dense and ovoid, sometimes collected into a close spike of about an inch, sometimes in a broken spike of several inches, or on the branches of a short, more or less spreading panicle. Each spikelet much flattened, ovate, 3- to 5-flowered. Glumes lanceolate, strongly keeled, ciliated on the back and pointed at the top, the flowering ones more so than the outer ones, the point often lengthened into a short awn.

In meadows, pastures, woods, and waste ground, throughout Europe, central and Russian Asia, except the extreme north. Abundant in Britain. *Fl.* the whole season.



Fig. 1212.

XXXIII. **DOG'S-TAIL.** CYNOSURUS.

Spikelets in sessile clusters, forming a one-sided spike or head; the outer spikelet of each cluster consisting of several glumes, all empty; the other spikelets containing 2 to 5 flowers; the glumes pointed or awned as in *Fescue*.

As now limited, the genus comprises but one Mediterranean species besides the two British ones.

Spike semicylindrical. Glumes pointed 1. *Crested D.*
 Spike ovoid. Glumes awned 2. *Rough D.*

1. Crested Dog's-tail. *Cynosurus cristatus*, Linn.

(Fig. 1213.)

(Eng. Bot. t. 316.)

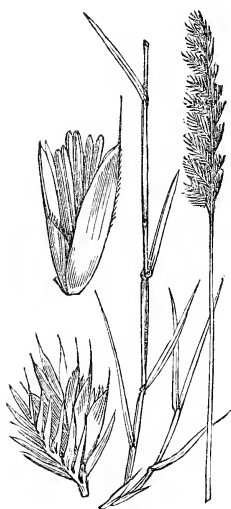


Fig. 1213.

A slightly tufted perennial, with short, narrow leaves, mostly radical, and a slender, often wiry, erect stem, from under a foot to near 2 feet high. Flowering spike semicylindrical, oblong or nearly linear, 1 to 3 inches long; the clusters regular, and all turned to one side; the outer elegantly pinnate empty spikelets being the most conspicuous, and forming a kind of involucre to each cluster, within which are 1 or 2 fertile spikelets, each with 3 to 5 flowers. The glumes, whether empty or flowering, all terminate in a very short point.

In rather dry, hilly pastures, and downs, throughout Europe and western Asia, except the extreme north. Abundant in Britain. *Fl. summer.* The dry stalks, rejected by sheep, and remaining all the autumn, are called *Bents* in many parts of the country.

2. Rough Dog's-tail. *Cynosurus echinatus*, Linn.

(Fig. 1214.)

(Eng. Bot. t. 1333.)

An annual, much less stiff than the last, with flaccid leaves. Spike ovoid and less regular; the glumes, both of the empty and of the flowering spikelets, all ending in an awn at least as long as themselves.

In fields and waste places, common in southern Europe and eastward to the Caucasus, extending up the west of Europe to the Channel Islands. In the main islands of Britain it only appears occasionally on the coasts, probably when introduced with ballast. *Fl. summer.*



Fig. 1214.

XXXIV. **QUAKEGRASS.** BRIZA.

Spikelets several-flowered, flat, broad, and short, hanging (in the British species) from the slender branches of a loose panicle. Glumes all broad, concave, but not keeled, obtuse, scarious on the edges, closely imbricated, and spreading.

A small genus, widely spread over the temperate regions of the northern hemisphere, some species extending also as weeds into the tropics and the southern hemisphere.

Perennial. Ligula of the leaves very short 1. *Common Q.*
Annual. Ligula of the upper leaves 3 to 6 lines long 2. *Lesser Q.*

The *larger Q.* (*B. maxima*), a south European species, with the spikelets above half an inch long, has been frequently cultivated in our flower-gardens.

1. **Common Quakegrass.** *Briza media*, Linn. (Fig. 1215.)

(Eng. Bot. t. 340.)

An erect, rather stiff, but very elegant perennial, from near a foot to $1\frac{1}{2}$ feet high, with a tufted or slightly creeping stock. Leaves flat but narrow and few, except at the base of the stem, their ligules very short. Panicle 2 to 4 inches long, very loose and spreading. Spikelets hanging from the long, slender branches, at first orbicular, then ovate, 2 to 3 lines long, variegated with green and purple, containing about 6



Fig. 1215.

to 8 flowers. Glumes all nearly similar, the outer pair empty, the upper ones gradually smaller.

In meadows and pastures, throughout Europe and Russian Asia, except the extreme north. Common in the greater part of Britain, but becoming scarce in the north of Scotland. *Fl. early summer.*

2. Lesser Quakegrass. *Briza minor*, Linn. (Fig. 1216.)

(Eng. Bot. t. 1316.)



Fig. 1216.

An erect annual, from 2 or 3 inches to near a foot high, with shorter and broader leaves than the *common Q.*, and much longer ligules. Panicle like that of the *common Q.*, but more branched and still more slender, the spikelets more numerous, smaller though rather broader in proportion, seldom attaining 2 lines in length.

In fields and waste places, in southern Europe, and eastward to the Caucasus, extending up the west coast of Europe to the English Channel. In Britain, in the southern counties of England, and has been occasionally found near Cork and Kinsale in Ireland. *Fl. summer, rather early.*

XXXV. **POA.** POA.

Spikelets several-flowered (rarely only 2-flowered),^{*} awnless, numerous, in a spreading or compact panicle. Outer glumes rather unequal, usually keeled. Flowering glumes obtuse or pointed, but not awned, scarious at the top, either keeled from the base or at the top only, or rounded to the top without any prominent keel.

A large genus, widely spread over all parts of the world. Although in many respects a natural one, its characters and limits are far from precise. It differs from *Fescue* only in its shorter glumes, without awns or decided points, and some species have been placed alternately in the one or the other genus. The first seven species are frequently separated, and formed into one, two, or more genera, characterized by minute differences in the nerves of the glumes or in the shape of the minute floral scales, or of the seed; and on the other hand, *Catabrose*, *Molinia*, *Triodia*, *Cock's-foot*, and *Kæleria*, although universally admitted, are distinguished by characters of very little more value. In the present state of our acquaintance with the most practical principles of classification in *Grasses*, the limits of *Poa*, as retained in the British Flora, appear to be the most natural.

Tall, aquatic plants. Spikelets not much flattened. Flowering glumes rounded on the back, with prominent veins, but not distinctly keeled.

Panicle large and spreading. Spikelets 3 to 5 lines long 1. *Reed P.*

Panicle long and narrow. Spikelets erect, 6 lines to an inch long 2. *Floating P.*

Plants not aquatic.

Panicle one-sided and stiff. Flowering glumes rounded on the back, at least at the base.

Panicle rather loose, 4 to 6 inches long. Glumes almost nerveless. Stock perennial.

Stem creeping at the base. Flowering glumes about $1\frac{1}{2}$ lines long.

Leaf-sheaths much flattened 9. *Flattened P.*

Leaf-sheaths not flattened 3. *Sea P.*

Stems tufted. Flowering glumes about 1 line long 4. *Reflexed P.*

Panicle compact, seldom 3 inches long. Spikelets crowded. Root annual.

Spikelets about 3- or 4-flowered. Flowering glumes strongly nerved 5. *Procumbent P.*

Spikelets 6- or more flowered. Flowering glumes faintly nerved 6. *Hard P.*

Panicle reduced to a single spike, with the lower spikelets occasionally clustered. Root annual . . . 7. Darnel P.

Panicle scarcely one-sided, the branches and pedicels

slender. Flowering glumes all keeled, with minute silky hairs on the keel or sides.

Root annual. No hairs on the axis of the spikelet . . . 8. *Annual P.*

Stock perennial. Minute woolly hairs on the axis under the flowering glumes.

Panicle ovate or oblong, more or less crowded.

Stem creeping at base. Leaf-stalks much flattened . . . 9. *Flattened P.*

Stock tufted. Stems and lower sheaths thickened at the base.

Stems bulbous at the base. Panicle contracted . . . 15. *Bulbous P.*

Stems scarcely bulbous. Panicle rather loose . . . 14. *Alpine P.*

Panicle loose or very long.

Glumes pointed. Flowers about 3.

Panicle long. Spikelets oblong or lanceolate.

Stems weak. Leaves narrow and flaccid.

Panicle slender 12. *Wood P.*

Stems tall. Leaves long and stiff. Panicle

very long and rather stiff *Purple Molinia.*

Panicle very spreading, with slender branches, and few, rather large, ovate spikelets.

(Alpine plant.) 13. *Wavy P.*

Flowering glumes rather obtuse. Panicle spreading, with numerous spikelets.

Rootstock with creeping scions. Flowers about

4 in the spikelet. Lateral nerves of the flowering glumes very faint 10. *Meadow P.*

No creeping scions. Flowers 2 or rarely 3 in the spikelet. Lateral nerves of the flowering

glumes conspicuous 11. *Roughish P.*

1. Reed Poa. *Poa aquatica*, Linn. (Fig. 1217.)

(Eng. Bot. t. 1315. *Glyceria*, Bab. Man.)

A stout, reed-like perennial, 4 to 6 feet high, with a creeping rootstock. Leaves flat and very rough on the edges. Panicle much branched, spreading, nearly a foot long. Spikelets numerous, with 5 to 8 or 10 flowers. Outer glumes unequal, thin, and 1-nerved. Flowering glumes about $1\frac{1}{2}$ lines long, loosely imbricated, strongly 5- or 7-ribbed, rather obtuse, and scarious at the top.

In wet ditches, and shallow waters, throughout Europe and Russian Asia, except the extreme north, and in North America. Frequent in England and Ireland, but rare in Scotland. *Fl. summer.*



Fig. 1217.

2. Floating Poa. *Poa fluitans*, Scop. (Fig. 1218.)

(Eng. Bot. t. 1520. *Glyceria fluitans* and *G. plicata*, Bab. Man.)

An aquatic perennial, often 2 or 3 feet high or more, with rather thick but weak stems, creeping at the base; the leaves often floating on the surface of the water. Panicle erect and slender, a foot long or more; the branches few and usually erect. Spikelets few, $\frac{1}{2}$ to 1 inch long, with from about 8 to near 20 flowers. Outer glumes unequal, thin, and 1-nerved. Flowering glumes loosely imbricated, $1\frac{1}{2}$ to near 3 lines long, strongly 5- or 7-ribbed, scarious at the top, obtuse or slightly pointed.

In wet ditches, muddy places, and stagnant or slow-running waters, throughout Europe and Russian Asia, except the extreme north, and in North America. Common in Britain. *Fl. all summer.*



Fig. 1218.

3. Sea Poa. *Poa maritima*, Huds. (Fig. 1219.)

(Eng. Bot. t. 1140. *Sclerochloa*, Bab. Man.)

A perennial, with a creeping rootstock and decumbent or erect stems, attaining about a foot in height. Leaves rather short, narrow, and usually convolute. Panicle erect, rather stiff, 3 or 4 inches long, or sometimes more; the branches erect, or the lower ones spreading. Spikelets not numerous, shortly stalked, all turned to one side of the branches, each about 6 lines long, and containing about 6 or 8 flowers. Glumes near $1\frac{1}{2}$ lines long, all rounded on the back, obtuse and scarious at the top, and faintly 5-nerved, the lowest outer one rather smaller.

In maritime sands, common on the coasts of Europe and western Asia, from the Mediterranean to the Arctic Circle, and in North America. Frequent all round the British Isles. *Fl. summer.*



Fig. 1219.

4. **Reflexed Poa.** *Poa distans*, Linn. (Fig. 1220.)
 (Eng. Bot. t. 936. *Sclerochloa*, Bab. Man. and *S. Borreri*, Eng. Bot. Suppl. t. 2797.)



Fig. 1220.

Very near the *sea P.*, of which it may possibly prove to be a mere variety. The stock is tufted or the stems scarcely creep at the base; the leaves are flatter, the stems taller and more slender, the panicle much more spreading with long, slender branches, and the spikelets smaller, the glumes not above a line long.

In sandy pastures, and waste places, chiefly near the sea, in Europe and western Asia, from the Mediterranean to the Arctic Circle, and in North America. In Britain, in the maritime counties of England, Ireland, and southern Scotland. *Fl. summer.*

5. **Procumbent Poa.** *Poa procumbens*, Curt. (Fig. 1221.)
 (Eng. Bot. t. 532. *Sclerochloa*, Bab. Man.)



Fig. 1221.

A tufted annual, with decumbent stems, 6 or 8 inches long, or very seldom attaining a foot. Leaves flat. Panicle branched, and one-sided as in the last two species, but much more compact, seldom above 2 inches long. Spikelets rather crowded, nearly sessile along the branches, about 4-flowered. Glumes as in the *sea P.*, but rather smaller, stiffer, with the nerves more conspicuous.

In waste ground near the sea, on the western coasts of Europe, from the Spanish Peninsula to Holland. Occurs on various parts of the coasts of England and Ireland, but a doubtful native of Scotland. *Fl. summer.*

6. Hard Poa. *Poa rigida*, Linn. (Fig. 1222.)(Eng. Bot. t. 1371. *Sclerochloa*, Bab. Man.)

A tufted annual, usually about 6 inches high, with stiff stems, erect or slightly decumbent at the base. Panicle lanceolate, one-sided, about 2 inches long, rather crowded; the branches slightly spreading. Spikelets on short, stiff pedicels, linear, about 3 lines long, each with about 6 or 8 flowers. Flowering glumes scarcely a line long, rather obtuse, with very faint lateral nerves, the outer empty pair more pointed and more distinctly nerved.

In waste, dry, or stony places, in central and southern Europe and western Asia. Common in southern England and Ireland, but neither in Scotland nor the extreme north of England. *Fl. summer.*



Fig. 1222.

7. Darnel Poa. *Poa loliacea*, Huds. (Fig. 1223.)(*Triticum*, Eng. Bot. t. 221. *Sclerochloa*, Bab. Man.)

A tufted annual like the last, but usually smaller and stiffer; the panicle reduced to an almost simple spike, along which the spikelets are almost sessile, in 2 rows, on alternate sides of the axis, but all turning one way; the lower ones often 2 or 3 together in a sessile cluster. Each spikelet is about 3 lines long, with 6 to 8 flowers. Glumes about a line long, more or less keeled, especially at the top, with faint lateral nerves and scarious edges, obtuse or slightly pointed; the outer empty pair nearly similar to the flowering ones, but more strongly nerved.

On sandy sea-shores, common on the Mediterranean and up the western coasts of Europe to the English Channel. Scattered here and there along the coasts of England and Ireland, and very local in Scotland. *Fl. sum-*



Fig. 1223.

mer. This species has been successively transferred by different botanists from *Triticum*, where it was originally placed by Smith, to *False-Brome* and *Fescue*, with all of which it has considerable affinity, or it has been made one of the small genera *Sclerochloa*, *Catapodium*, or *Scleropoa*, more recently established.

8. Annual Poa. *Poa annua*, Linn. (Fig. 1224.)

(Eng. Bot. t. 1141.)



Fig. 1224.

A tufted annual, usually about 6 inches high, with flat, flaccid, bright-green leaves. Panicle loose and spreading, $1\frac{1}{2}$ to 3 inches long, with slender branches. Spikelets all stalked, oblong or linear, each with from 3 to 6 or rarely more flowers. Flowering glumes scarious at the top, keeled from the base; the lateral nerves also slightly prominent when dry, without woolly hairs on the axis of the spikelet, but very minutely silky-hairy on the keel.

In cultivated and waste places, most abundant in the temperate regions of the northern hemisphere, but extending into almost every part of the globe. Very common in Britain, and a chief ingredient in the grass of some of the London Parks. *Fl. nearly the whole year round.* It will often germinate, flower, ripen and shed its seeds, and die away, in the course of a few weeks.

9. Flattened Poa. *Poa compressa*, Linn. (Fig. 1225.)

(Eng. Bot. t. 365, and *P. polynoda*, Bab. Man.)

A perennial, seldom above a foot high, with a creeping rootstock, and erect stems more or less flattened at the base. Leaves rather short, with flattened sheaths and a short, obtuse ligula. Panicle oblong, 2 to 3 inches long, slightly spreading, but rather crowded, with many of the spikelets sessile, and the branches turned towards one side, but not so much so as in the *procumbent* and the *sea P.* Spikelets ovate-oblong, usually 4- to 6-flowered, with occasionally a few woolly

hairs on the axis. Flowering glumes about a line long, with minute silky hairs along the keel; the lateral nerves not prominent.

On dry, barren, waste ground, and frequently on walls, in temperate and southern Europe, in Russian Asia, and North America, extending far into Scandinavia, but not an Arctic plant. Frequent in England, Ireland, and southern Scotland, but apparently not further north. *Fl. all summer.*



Fig. 1225.

10. Meadow Poa. *Poa pratensis*, Linn. (Fig. 1226.)

(Eng. Bot. t. 1073, and *P. subcærulea*, t. 1004.)

A perennial, 1 to 2 feet high, with a more or less creeping rootstock or emitting creeping scions aboveground. Leaves rather narrow, with a short obtuse ligula. Panicle 2 to 3 inches long, with slender, spreading branches. Spikelets numerous, ovate or oblong, all or nearly all stalked, each with about 4 flowers. Flowering glumes rather more than a line long, with minute silky hairs on the keel; the lateral nerves scarcely prominent.

In meadows and pastures, throughout Europe and central and Russian Asia, from the Mediterranean to the Arctic Circle, in North America, and reappearing in the southern hemisphere. Abundant in Britain. *Fl. summer, commencing early.*

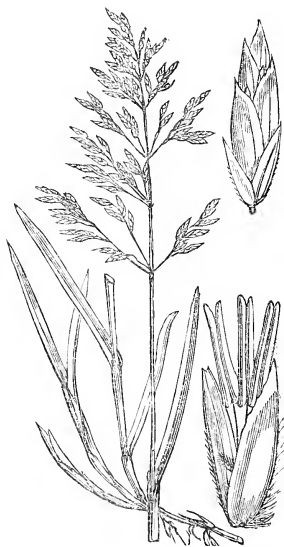


Fig. 1226.

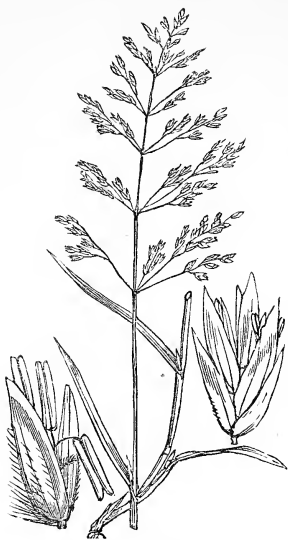


Fig. 1227.

11. Roughish Poa. *Poa trivialis*,
Linn. (Fig. 1227.)

(Eng. Bot. t. 1072.)

Very near the *meadow P.*, but there are no creeping scions; the stems are usually taller and more slender; the ligula of the leaf longer; the panicle more slender, often 6 inches long, with slender, spreading branches; the spikelets have seldom more than 3 flowers, and usually only 2. Flowering glumes as in the *meadow P.*, except that the lateral nerves are much more conspicuous.

In meadows and pastures, with the same geographical range as the *meadow P.*, and at least as common. Abundant also in Britain. *Fl.* summer, commencing early.



Fig. 1228.

12. Wood Poa. *Poa nemoralis*,
Linn. (Fig. 1228.)

Eng. Bot. t. 1265, *P. cæsia*, t. 1719, *P. glauca*, t. 1720, *P. Parnelli*, Suppl. t. 2916, and *P. Balfourii*, Suppl. t. 2918.)

A perennial, 1 to 2 feet high, tufted or slightly creeping at the base, erect, but weaker and more slender than the last two, with narrower leaves, their ligules very short. Panicle contracted or spreading, with slender branches. Spikelets compressed, lanceolate or ovate, with 2 to 5 flowers in each, and scarcely any woolly hairs on the axis. Flowering glumes rather more than a line long, lanceolate, more pointed than in the last two species, with a line of small silky hairs on each side and another on the keel.

In woods and shady places, and on

moist mountain rocks throughout Europe and Russian Asia from the Mediterranean to the Arctic regions. Frequent in Britain. *Fl. summer*. A mountain variety, often distinguished under the name of *P. cæsia*, has the stems usually shorter, the panicle less branched, and the spikelets rather longer, but it passes gradually into the common form.

13. Wavy Poa. *Poa laxa*, Hænke. (Fig. 1229.)

(*P. flexuosa*, Eng. Bot. t. 1123. *P. minor*, Bab. Man.)

A tufted or slightly creeping perennial, seldom a foot high, near the *alpine P.*, but more slender, with narrower and more numerous leaves. Panicle loose, with few spreading branches. Spikelets rather larger than in the *alpine P.*, from 1 to 3 on each branch of the panicle, ovate, each with 3 or 4 flowers. Glumes about 2 lines long, more pointed than in most *Poas*.

An alpine species, confined to high northern latitudes, or to great elevations in the mountains of Europe, Russian Asia, and North America. In Britain, only on Ben Nevis and Loch-na-Gar, in Scotland, where it is usually in a viviparous state, and then not easily distinguished from the *alpine P.* I myself have seen no Scotch specimens that I could refer with certainty to the *wavy P.*



Fig. 1229.

14. Alpine Poa. *Poa alpina*, Linn. (Fig. 1230.)

(Eng. Bot. t. 1003.)

Stems tufted, often swollen at the base, but not so much so as in the *bulbous P.*, 6 inches to a foot high. Leaves short, rather broad, mostly radical or nearly so, and when perfect have a short inflected point. Panicle ovoid, about 2 inches long, rather spreading, with short but slender branches. Spikelets crowded, ovate, 3- to 5-flowered. Flowering glumes pointed and keeled; the lateral nerves not prominent, with a few minute silky hairs on the keel and edges, but with little or no wool at their base on the axis of the spikelet.

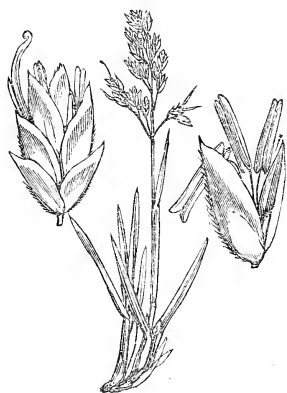


Fig. 1230.

In alpine pastures, common in all the great mountain-ranges of Europe and central and Russian Asia, and at high latitudes in North America. Abundant on the higher mountains of Scotland, Ireland, and northern England, and frequently in a viviparous state, the spikelets being converted into leafy bulbs. *Fl. summer.*

15. **Bulbous Poa.** *Poa bulbosa*, Linn. (Fig. 1231.)

(Eng. Bot. t. 1071.)



Fig. 1231.

A low, tufted perennial, seldom above 6 inches high, and remarkable for the bulbs formed by the swollen base of the stems and leaf-sheaths. Leaves short, the ligula of the upper ones prominent and acute. Panicle ovoid or oblong, spike-like or scarcely spreading, not much above an inch long. Spikelets ovate, 3- or 4-flowered. Flowering glumes about a line long, or rather more, pointed and keeled; the lateral nerves not prominent, with minute silky hairs on the keel and edges, and a few short woolly ones at their base on the axis of the spikelet.

In dry waste places, on roadsides, etc., especially near the sea, in temperate and southern Europe, and across Russian Asia, extending northwards into southern Scandinavia. In Britain, chiefly near the sea, in the southern and eastern counties of England, but not recorded from Ireland or Scotland. *Fl. spring.*

XXXVI. **CATABROSE.** CATABROSA.

A single species, closely allied to *Poa*, but the spikelets have usually

only 2 flowers, the glumes broad and truncate at the top or slightly jagged.

1. **Water Catabrose.** *Catabrosa aquatica*, Beauv.

(Fig. 1232.)

(*Aira*, Eng. Bot. t. 1557.)

A glabrous, tender, pale-green perennial; the stems procumbent, and creeping or floating at the base, rooting at the nodes, and often 2 or 3 feet long; the flowering branches erect. Leaves short, flat, and flaccid. Panicle 4 to 6 inches long, consisting of many sets of half-whorled, unequal, slender, and spreading branches. Spikelets 1 to near 2 lines long. Outermost glume very short and small, the second larger, broad, and truncate at the top like the flowering ones, but much shorter: these are scarious, and slightly toothed or jagged at the top, with very prominent ribs. Paleas similar but rather smaller, with only 2 ribs.



Fig. 1232.

In shallow pools, and ditches, in Europe and Russian Asia, from the Mediterranean to the Arctic regions. Generally, although thinly, scattered over Britain. *Fl.* early summer.

XXXVII. **MOLINIA.** MOLINIA.

A single species, very near *Poa* and *Fescue*, differing from the former in the much pointed glumes, from *Fescue* in the smaller and rather less flattened spikelets. There is also, at the base of the palea of the uppermost flower, a small, bristle-like appendage, being a continuation of the axis of the spikelet, and bearing sometimes the rudiment of another flower, although less conspicuous than in *Melick*. This rudimentary terminal flower may however be occasionally observed in most of the allied genera.

1. **Purple Molinia.** *Molinia cærulea*, Mœnch. (Fig. 1233.)

(*Melica*, Eng. Bot. t. 750.)

A rather coarse, stiff perennial, often 3 feet high, with the leaves chiefly radical, forming large tufts, long and flat, rather stiff, and slightly hairy on the upper side. Panicle narrow but loose, 6 inches



Fig. 1233.

to above a foot long, green or purplish ; the branches erect or scarcely spreading. Spikelets erect, narrow and pointed, 2 to 4 lines long, usually with about 3 flowers. Glumes acute, the outer one shorter than the flowering ones, and rather unequal.

In wet heathy places, moors, woods, and waste places, throughout Europe and Russian Asia, from the Mediterranean to the Arctic regions. Common in Britain, except where destroyed by cultivation. *Fl. late in summer, or autumn.*

XXXVIII. **MELICK.** MELICA.

Spikelets awnless, rather large, and few in a slender panicle, each with 1 or 2 flowers, besides a small, terminal, wedge-shaped glume, enclosing 1 or 2 more minute or rudimentary ones. Glumes broad and several-nerved, but not keeled ; the outer empty ones thin, the flowering ones of a rather firmer texture.

A small but natural and widely dispersed genus, readily known by the small, terminal, empty glumes, much more conspicuous than in any of the allied genera.

Spikelets drooping, 2-flowered	1. <i>Mountain M.</i>
Spikelets erect, 1-flowered	2. <i>Wood M.</i>

1. **Mountain Melick.** *Melica nutans*, Linn. (Fig. 1234.)

(Eng. Bot. t. 1059.)

A slender erect perennial, 1 to 2 feet high, with erect, flat leaves. Panicle one-sided, 2 to 3 inches long ; the short but slender branches usually erect, so as to give it the appearance of a simple raceme. Spikelets about 10 to 15, drooping, 3 or even 4 lines long, 2-flowered ; the

outer glumes brown or purple, with scarious edges, the flowering ones scarcely protruding beyond them; the inner imperfect glume much shorter, broadly wedge-shaped.

In woods, and shady rocky places, in hilly districts, extending all over Europe and Russian Asia, from the mountains of the south to the Arctic Zone. In Britain, chiefly in Scotland and the north of England, not recorded from Ireland. *Fl.* early summer.



Fig. 1234.

2. Wood Melick. *Melica uniflora*, Linn. (Fig. 1235.)

(Eng. Bot. t. 1058.)

An elegant perennial, 1 to 2 feet high, more slender even than the *mountain M.*, with longer and narrower leaves. Leaf-sheath quite closed opposite to the blade, as in the *Sedge* family, and produced into a small green point. Panicle sometimes reduced to an almost simple raceme with only 3 or 4 spikelets, sometimes with a few long, slender, distant branches, each bearing several spikelets. Each spikelet near 3 lines long, coloured as in the *mountain M.*, but erect and containing but one flower; the imperfect inner glume oblong, stalked, and reaching to the height of the flowering one.

In woods and shady places, in central and southern Europe, extending eastward to the Caucasus and northward into Scandinavia. Frequent in England and Ireland, much less so and quite partially distributed in Scotland. *Fl.* early summer.



Fig. 1235.

XXXIX. **TRIODIA.** TRIODIA.

Spikelets awnless, rather large, and few in a panicle, contracted almost into a simple raceme, and few-flowered. Outer glumes pointed, as long as the flowering ones or longer; flowering glumes with 3 very minute teeth at the top.

A small genus, chiefly Australian, differing from *Oat* and its allies chiefly in the absence of any awn, from *Fescue* in the outer glumes usually exceeding the flowering ones.

1. **Decumbent Triodia.** *Triodia decumbens*, Beauv.

(Fig. 1236.)

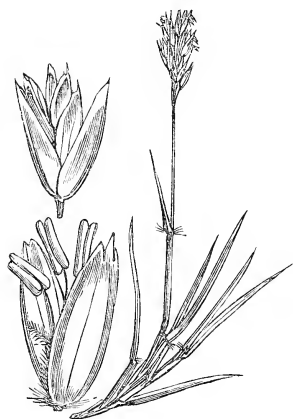
(*Poa*, Eng. Bot. t. 792.)

Fig. 1236.

A tufted perennial, 6 inches to a foot high. Leaves narrow, with a few long soft hairs on their sheaths and edges, and a tuft of hairs in the place of their ligula. Spikelets seldom more than 5 or 6, erect, containing 3 or 4 flowers. Outer glumes of a firm consistence, but nearly scarious towards the edges, 4 or 5 lines long, concave but keeled, very pointed and glabrous; flowering glumes deeply concave, ending in 3 minute teeth, the central one more pointed, but all 3 often scarcely prominent.

On dry heaths, and hilly pastures, in central and northern Europe and western Asia, extending from northern Spain and Italy far into Scandinavia, but not an Arctic plant. In Britain, generally

distributed and rather common. *Fl. summer.*

XL. **KCELERIA.** KCELERIA.

Spikelets few-flowered, in nearly sessile clusters, crowded into an oblong or nearly cylindrical spike-like panicle; the glumes keeled, scarious on the edges, pointed, or, in some exotic species, awned.

A small genus, chiefly European and Asiatic, with a few species from the southern hemisphere, all closely allied to *Poa* and *Fescue*,

from which they differ chiefly in inflorescence, which is nearer to that of *Phleum* or *Phalaris*.

1. **Crested Kœleria.** *Kœleria cristata*, Pers. (Fig. 1237.)

(*Aira*, Eng. Bot. t. 648.)

A perennial, usually about 6 inches high, with a dense tuft of short leaves, chiefly radical; but in luxuriant specimens the stems attain a foot, with leaves almost as long. Spike cylindrical, 1 to 2 inches long or even more, the lower clusters more or less distant. Spikelets usually 2- or 3-flowered; the glumes $1\frac{1}{2}$ to 2 lines long, and very pointed; the outer ones unequal, and scarious on the edge only; the flowering ones white and scarious, except the green keel, giving the spike a variegated and shining, silvery-grey aspect.

In dry pastures, in central and southern Europe, extending more sparingly northwards into Scandinavia, in central and Russian Asia, in North America, and New Zealand. Widely distributed over the hilly districts of Britain, and abundant in some parts, but rare, or wholly wanting in others. *Fl. summer*.



Fig. 1237.

XLI. **SESLERIA.** SESLERIA.

Spikelets few-flowered, in nearly sessile clusters, crowded into an ovoid or cylindrical spike-like panicle, as in *Kœleria*, but there is usually a glume-like bract on the main axis, at the base of the lower spikelets. Outer glumes nearly equal and pointed, the flowering ones 3- or 5-toothed at the top, the central tooth lengthened into a point, or (in exotic species) into a short awn.

A small genus, chiefly south European and west Asiatic, differing from *Poa* in the inflorescence, and in most species by the presence of an outer bract under the spikelets, which is analogous to those of the *Sedge* family.

1. Blue Sesleria. *Sesleria cærulea*, Ard. (Fig. 1238.)

(Eng. Bot. t. 1613.)



Fig. 1238.

A perennial, 6 inches to nearly a foot high, with a shortly creeping rootstock, and densely tufted, short, and rather stiff radical leaves. Spike (or spike-like panicle) ovoid or oblong, $\frac{1}{2}$ to $\frac{3}{4}$ inch long, often assuming a bluish-grey hue. Spikelets not numerous, but closely packed, generally in pairs, one sessile, the other shortly stalked; the lower ones with a broad, glume-like bract at their base. Glumes about 2 lines long, the flowering ones usually 2 in each spikelet, shortly protruding beyond the outer ones, their central tooth forming a short point.

In mountain pastures, especially in limestone districts, in Europe and western Asia, from the mountains of Spain and Italy to Scandinavia. In Britain, confined to Scotland, the North of England, and the north and west of Ireland. *Fl. spring and early summer.*

XLII. **REED.** ARUNDO.

Very tall, erect, perennial Grasses, with long, broad leaves, and a large, crowded panicle. Spikelets several-flowered, with long, silky hairs on the axis, enveloping the flowers.

The species, though not numerous, are very conspicuous in the temperate and warmer climates both of the new and the old world, and form a natural genus if considered as including, as well our northern species, often separated under the name of *Phragmites*, as the South American *Pampas Grass*, recently introduced into our gardens, and generically distinguished under the name of *Gynerium*, on account of its flowers usually (but, it is said, not always) diœcious. The genus differs from *Seareed* and *Smallreed* chiefly in having more than one flower in the spikelet.

1. Common Reed. *Arundo Phragmites*, Linn. (Fig. 1239.)(Eng. Bot. t. 401. *Phragmites communis*, Brit. Fl.)

A stout perennial, usually 5 or 6 feet high, but sometimes twice as much, with a long, creeping rootstock, and numerous long leaves, often

an inch broad, all the way up the stem. Panicle from a few inches to a foot long, with numerous branches, more or less drooping, of a purplish-brown colour, Spikelets very numerous, narrow, above 6 lines long. Outermost glume lanceolate, concave, about $1\frac{1}{2}$ lines long, and empty; the second narrower, and twice that length; the third still longer, and also empty, or with 1 or 2 stamens only; and all 3 without hairs outside. Above are 2 or 3 flowering glumes about the same length, but narrower, ending in an almost awn-like point, and surrounded by silky hairs which lengthen much as the seed ripens, giving the panicle a beautiful silvery appearance.

In wet ditches, marshes, and shallow waters, almost all over the world, from the tropics to the Arctic Zone. Common in Britain. *Fl. end of summer, and autumn.*



Fig. 1239.

CLASS III. CRYPTOGRAMS.

No real flowers, that is, neither stamens, nor pistils, nor true seeds, the fructification consisting of minute, often highly microscopic granules, called *Spores*, variously enclosed in sessile or stalked capsules, or imbedded within the substance of the plant, the capsules themselves sometimes so small as to be scarcely visible without the aid of a microscope.

The few British *Cryptogams* which are included in the present work have all of them roots, and stems or rootstocks, very similar in structure to those of some *Monocotyledons*, and in some the leaves are also nearly the same, but in others the leaves are more or less converted into fruiting branches, bearing the fructification on their surface or edges, and are therefore now generally distinguished from true leaves by the name of *fronds*. In the remaining families of *Cryptogams*, called *Cellular*, there is either no distinct stem, or the stem does not contain any fibres or vascular tissue. None of these can be readily determined without the use of high magnifying powers, and

the assistance of carefully executed plates. However great, therefore, may be the interest attached to them, they are beyond the scope of the present Flora; and the amateur of British Botany, desirous of entering into their study, is referred to the works of Hooker, Wilson, Harvey, Berkeley, and others, devoted each to particular families. These *Cellular Cryptogams* are comprised in the five following families:—

MOSESSES. Stem and leaves distinct, but without vessels. Spores contained in little globular or awn-shaped capsules, which are usually pedicellate, and open by the falling off of a lid at the top.

HEPATICÆ. Stem and leaves sometimes like those of *Mosses*, sometimes reduced to flat, leaf-like expansions. Spores contained in little capsules, either stalked, as in the *Mosses*, but opening in valves, or immersed in the substance of the frond.

LICHENS. Plants consisting of a variously-shaped flat, or shortly erect expansion called the *thallus*, not usually green, but turning greenish if rubbed, sometimes so thin as not to be distinguished but by colour from the stones or bark they grow on. Fructification in little shield-like or wart-like bodies on the surface of the thallus.

FUNGI. Plants of infinite variety of shape and colour, but not green even when rubbed, usually growing on decaying organized substances, often themselves microscopic, and their fructification always so. They include *Mushrooms*, *Moulds*, *Mildews*, *Dry-rot*, *Vinegar Plants*, etc.

ALGÆ. Aquatic plants, entirely submerged, variously coloured; the fructification usually imbedded in the substance of the frond, and almost always microscopic. They include the *Seaweeds*, the fresh-water *Confervas*, and according to some authors the *Charas* also, which in the short, whorled branches of their fronds show some approach to the *Equisetum* family, but they float like the *Algæ*, and have axillary fructifications.

LXXXVIII. CLUBMOSS FAMILY. LYCOPODIACEÆ.

Leaves radical or alternate, undivided in the British genera. Spores enclosed in capsules, sessile or nearly so, either at the base or in the axils of the leaves, or forming a terminal spike interspersed with leaf-like bracts.

Aquatic plants, with linear, grass-like, radical leaves.

Stock tufted. Fructification in the thickened base of the

leaves 1. QUILLWORT.

Rockstock creeping. Capsules globular, in the axils of the

leaves 2. PILLWORT.

Terrestrial plants, with the leaves usually short and crowded 3. CLUBMOSS.

I. **QUILLWORT.** ISOETES.

Stock very short, rooting at the base, bearing a tuft of linear leaves, the whole plant usually under water. Capsules more or less enclosed within the enlarged base of the leaves, those of the outer leaves filled with minute powdery granules, those of the inner leaves containing larger grains, at first cohering in fours.

A small genus, widely spread over the greater part of the globe.

1. **European Quillwort.** *Isoetes lacustris*, Linn.

(Fig. 1240.)

(Eng. Bot. t. 1084.)

A perennial, of a bright green, forming dense tufts under the water. Leaves narrow-linear, much like those of several *Monocotyledons*, varying from 2 to 6 inches long, their enlarged bases giving the plant often a bulbous appearance.

In mountain pools, and shallow lakes, in central and northern Europe, northern and Arctic Asia, and North America. In Britain, in the mountainous parts of Scotland, northern England, Wales, and Ireland. *Fl. summer and autumn.* Modern botanists distinguish as a species under the name of *I. echinospora*, a form found in our mountain lakes, often growing with the common one, but said to be only where the soil is peaty. It differs chiefly in the larger spores covered with acute tubercles instead of being granulate only or nearly smooth on the surface. A rather more distinct-looking form referred by Hooker to *I. Duriaei* (Fig. 1241) and by Babington to *I. hystrix*, occurs in moist sandy hollows on Lancesse Common in Guernsey. The root-stock is covered outside the tuft of leaves with a number of small imbricate toothed or jagged brown scales, which are the persistent remains of old leaves, and which are never observed in the common under-water forms. It remains to be seen how far this difference may be owing to situation.

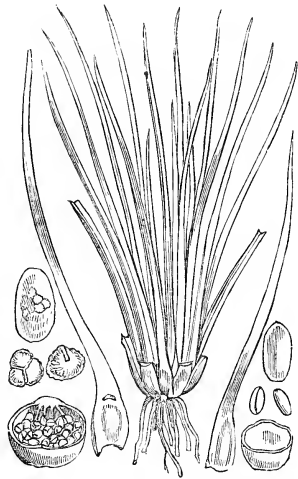


Fig. 1240.

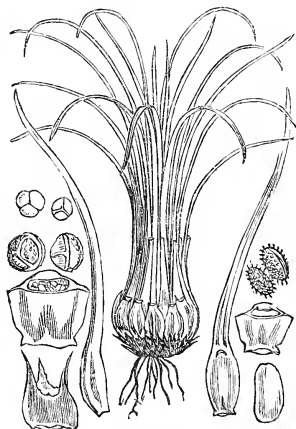


Fig. 1241.

II. **PILLWORT.** PILULARIA.

Rootstock creeping under water, with subulate leaves almost solitary at the nodes. Capsules globular, almost sessile in the axils of the leaves, divided into 4 cells, opening when ripe, at the top, in 4 valves, and containing very minute powdery granules and some larger grains.

The genus consists but of a single species.

1. **Creeping Pillwort.** *Pilularia globulifera*, Linn.

(Fig. 1242.)

(Eng. Bot. t. 521.)

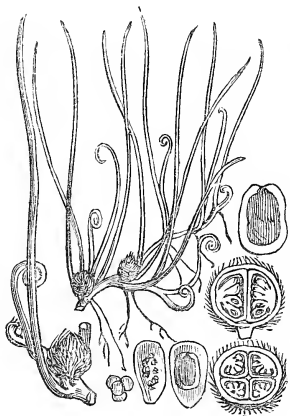


Fig. 1242.

The slender rootstock often creeps to a considerable extent, rooting at every node. Leaves very fine, bright green, usually 2 or 3 inches long. Capsules like little pills, near 2 lines diameter, and covered with short hairs.

In the shallow edges of pools and lakes, in temperate Europe and western Asia; not recorded either from the Arctic or the Mediterranean regions. Widely distributed over Britain, and in some places not uncommon, but often overlooked. *Fr. summer and autumn.*

III. **CLUBMOSS.** LYCOPODIUM.

Perennials, with a branched, usually creeping stem, crowded with small, moss-like, entire or minutely serrated leaves. Capsules sessile either in the axils of the upper stem-leaves, or of bracts usually thinner and broader than the stem-leaves, and forming an erect, cylindrical terminal spike; each capsule opening by a transverse slit in 2 valves, and either all filled with minute powdery granules, or some containing larger grains.

A large genus, widely spread over every part of the globe, and readily divisible into two sections, often considered as genera, the true

Clubmosses, with all the capsules filled with minute powdery granules, which comprise our first five species; and the *Selaginellas*, which have capsules of both kinds, and are represented in Britain only by the *lesser C.*

Capsules in the axils of the stem-leaves. Stems tufted,
scarcely creeping 4. *Fir C.*

Capsules in terminal spikes. Stems creeping or prostrate.

Creeping stems long and hard. Fruiting branches forked
or clustered.

Leaves about 1 line long, closely imbricated in 4 rows 3. *Alpine C.*

Leaves 2 or 3 lines long, spreading, with fine points.

Spikes pedunculate, usually 2 or 3 together . . . 1. *Common C.*

Spike solitary and sessile above the last stem-leaves 2. *Interrupted C.*

Creeping or prostrate stems slender, 1 to 3 inches long.

Fruiting branches simple.

Creeping stems slightly branched, with narrow leaves
all turned up one way 5. *Marsh C.*

Prostrate stems much branched. Leaves small,
spreading 6. *Lesser C.*

1. Common Clubmoss. *Lycopodium clavatum*, Linn.

(Fig. 1243.)

(Eng. Bot. t. 224.)

Stems hard, creeping, 1 to 2 feet long, with ascending forked branches, 1 to 3 inches long, all completely covered with the crowded, moss-like, but rather stiff leaves, which are linear, 2 to 3 lines long, including their fine, hair-like points; those on the creeping stem all turned upwards; those on the branches imbricated all round. Spikes 1 to 1½ inches long, scattering their yellow dust in great profusion, 2 or sometimes 3 together on a peduncle at least as long, bearing small, narrow, yellowish leaves or scales, about half as large as the stem-leaves.

In hilly pastures and heaths, in central and northern Europe, Russian Asia, and North America, extending from the Pyrenees and the Alps to the Arctic regions, and in the southern hemisphere. Generally distributed over Britain, but more common in the north. *Fr. summer and autumn.*

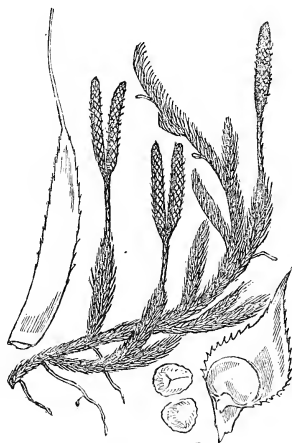


Fig. 1243.

2. Interrupted Clubmoss. *Lycopodium annotinum*, Linn.
(Fig. 1244.)

(Eng. Bot. t. 1727.)

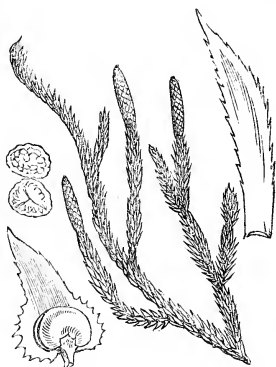


Fig. 1244.

The long, hard, creeping stems, with short ascending branches all covered with leaves, are the same as in the *common C.*, but the leaves are much stiffer, more spreading, fully 3 lines long, without any hair-like point, and the spikes, seldom an inch long, are always solitary and closely sessile at the extremity of the leafy branches.

In mountain heaths, woods, and stony places, in central and northern Europe, Russian Asia, and North America, extending from the Alps to the Arctic regions. In Britain, only in the mountains of Scotland, northern England, and North Wales. *Fr. summer and autumn.*

3. Alpine Clubmoss. *Lycopodium alpinum*, Linn.
(Fig. 1245.)

(Eng. Bot. t. 234.)

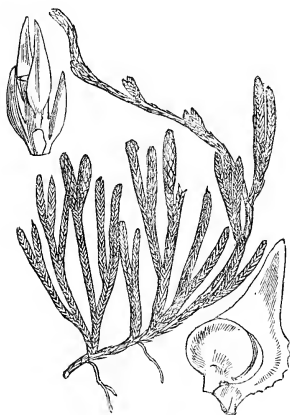


Fig. 1245.

The stems creep as in the last two species, and sometimes attain a considerable length, but the ascending branches are much more divided, forming close clusters or tufts, 2 to 3 inches high. Leaves scarcely above a line long, few on the creeping stems, numerous on the branches, and closely imbricated in 4 rows. Spikes about $\frac{1}{2}$ inch long, closely sessile, and solitary at the extremity of the leafy branches.

In mountain pastures, in Europe and central and Russian Asia, extending from the Pyrenees and Alps to the Arctic regions. In Britain, common in the mountains of Scotland, northern Ireland, and northern and central England, and in one locality in Somersetshire. *Fr. summer.*

4. **Fir Clubmoss.** *Lycopodium Selago*, Linn. (Fig. 1246.)

(Eng. Bot. t. 233.)

Stems scarcely creeping, though slightly decumbent and rooting at the base; the forked branches forming dense, level-topped tufts, 3 or 4 inches high, completely covered with their crowded but spreading dark-green leaves, all lanceolate, 3 or 4 lines long, with a short fine point. Capsules in the axils of the upper leaves, not forming a distinct spike; they are sometimes replaced by little pedicellate leafy bulbs.

In hilly pastures, in Europe, Russian Asia, and North America, extending from Spain, northern Italy, and the Caucasus to the Arctic regions, and in the southern hemisphere. Frequent in all hilly parts of Britain, except some of the southern counties of England. *Fr. summer and autumn.*

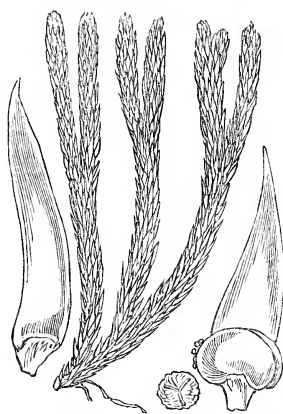


Fig. 1246.

5. **Marsh Clubmoss.** *Lycopodium inundatum*, Linn.

(Fig. 1247.)

(Eng. Bot. t. 239.)

Stems slender and creeping, scarcely branched, seldom above 2 inches long, with narrow-linear leaves, about 2 lines long, all turned upwards. Fruiting branches solitary, simple and erect, $1\frac{1}{2}$ to 3 inches high, with leaves like those of the stem, but loosely scattered all round. The upper end of the branch is thickened into a fruiting spike, from $\frac{3}{4}$ to 1 inch long; the bracts very like the stem-leaves but broader at the base.

In heathy bogs and sandy swamps, dispersed over the greater part of Europe, especially the western States, and in North America, but not recorded either from Asia or the Arctic regions.

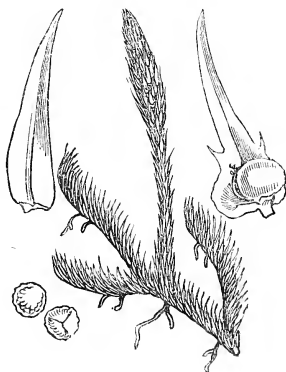


Fig. 1247.

Irregularly distributed over various parts of Scotland and England, but not common; in Ireland has been found only on the margin of a small lake at Letterfrack, in Connemara. *Fr. summer and autumn.*

6. Lesser Clubmoss. *Lycopodium selaginoides*, Linn.

(Fig. 1248.)

(Eng. Bot. t. 1148.)



Fig. 1248.

Stems slender, prostrate, much branched, forming moss-like patches 3 or 4 inches in diameter. Leaves spreading, lanceolate, pointed, 1 to $1\frac{1}{2}$ lines long, not so densely crowded as in the other species. Fruiting branches ascending or erect, solitary and simple, with rather longer leaves; those of the spike or fruiting part fully 2 lines long, lanceolate, and bordered with a few fine teeth. Spike $\frac{1}{2}$ to $\frac{3}{4}$ inch long, the upper capsules filled with a minute powdery dust, the lower containing larger grains.

In moist mountain pastures, and wet, stony places, in Europe, Russian Asia, and North America, extending from the Alps and Pyrenees to the Arctic regions.

Not uncommon in Scotland, northern and central England, North Wales, and northern Ireland. *Fr. summer and autumn.*

LXXXIX. EQUISETUM FAMILY. EQUISETACEÆ.

A family consisting of a single genus, distinguished from all others as well by the articulate stems and whorled branches, only resembling some of the larger fossil plants now extinct, as by the fructification.

I. EQUISETUM. EQUISETUM.

Leafless herbs, with a perennial, usually creeping rootstock, and erect, rush-like, hollow, and jointed stems, marked with longitudinal

striæ or furrows, with a sheath at each joint which encloses the base of the next internode, and is bordered with short or elongated teeth, usually as many as the striæ of the stem. These stems are either simple or have at each node, from the base of the sheath, a whorl of jointed branches similar to the stem, but with fewer striæ, and always simple, except in the *wood E.* Fructification an ovoid or oblong terminal spike, consisting of several whorls of peltate, shield-shaped, shortly-stalked scales (usually brown or black), under each of which are several (about 6 or 7) capsules, filled with minute spores and opening down the inner side. Under the microscope there will be seen to be attached to each spore at its base 4 thread-like filaments, club-shaped at the top, rolled spirally round the spore when moist, uncoiling elastically when dry.

The species are not numerous, although widely diffused over the temperate and colder regions of the northern hemisphere, extending more sparingly into tropical countries. Some of them accommodate themselves to a great variety of stations and become very variable. To determine them it is not only necessary to have the fruiting stem, but also to observe whether the plant bears or not barren fronds at the same time, and whether these are similar or dissimilar to the fruiting ones. Accidental variations must also be guarded against. The side branches sometimes bear spikes, or shoots similar to these side branches may arise from the stock, and if gathered alone, without observing the more ordinary state of the stems, may become very puzzling.

Fruiting stems, in spring, simple, thick, with long, loose sheaths, and withering before the barren ones appear.

Sheaths of the fruiting stems more than an inch long, with numerous subulate teeth 1. *Great E.*

Sheaths under an inch, distant from each other, with about 8 or 10 lanceolate teeth 2. *Field E.*

Fruiting stems appearing in or lasting till summer, at the same time as the barren ones, and nearly similar to them.

Sheaths with few lanceolate lobes. Branches of the stem again branched at the nodes (in the fruiting stems appearing often after the fruiting has commenced) 3. *Wood E.*

Sheaths with short or subulate teeth.

Spike very obtuse.

Striæ of the stem, and teeth of the sheaths numerous (usually 15 to 20).

Branches few in each whorl or none. Stems mostly fruiting and similar 5. *Smooth E.*

Branches of the barren stems numerous in each whorl. Fruiting stems simple at first, the branches growing out afterwards 4. *Shady E.*

Angles of the stem and teeth of the sheaths few (rarely more than 8) 6. *Marsh E.*

Spike terminating in a short point or minute cone.

Stems usually simple. Whorled branches none or very rare.

Stems tall, with numerous (usually 15 to 20) striæ and sheath-teeth 7. *Rough E.*

Stems low and slender, often tufted, with few (usually 8 to 10) striæ and sheath-teeth . . . 9. *Variegated E.*

Stems, at least the central one, with whorled branches.

Striæ and sheath-teeth few (usually 8 to 12) . . . 8. *Long E.*

1. Great Equisetum. *Equisetum Telmateia*, Ehrh. (Fig. 1249.)

(*E. fluviatile*, Eng. Bot. t. 2022.)

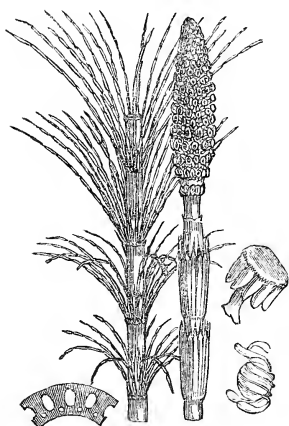


Fig. 1249.

The fruiting stems appear alone early in spring, they are quite simple, 8 or 10 inches high, as thick as a finger, of a pale-brown colour; the sheaths rather loose, an inch long or more, completely covering the stem from one joint to the next, of a dark brown, marked with 20 to 30 or more longitudinal striæ, and fringed with as many long, subulate teeth, or half as many, these teeth being often joined 2 and 2 together. Spike fully 2 inches long, the lower whorls of scales often distinct. Barren stems appearing after the fruiting ones have withered away, often several feet high, white, with the tips of the sheaths black; the long, crowded, slender branches very numerous in each whorl.

In marshy, shady, wet, or gravelly places, in temperate Europe, not extending northward into Scandinavia, nor perhaps southward into Spain, but eastward to Greece and the Caucasus, and thence all across Russian Asia, and in North America. Common in the greater part of England and Ireland, but not penetrating far into Scotland. *Fr. early spring.*

2. Field Equisetum. *Equisetum arvense*, Linn. (Fig. 1250.)

(Eng. Bot. t. 2020. *Common Horsetail.*)

Fruiting stem simple, thick, 8 or 10 inches high, and dying before the barren ones appear, as in the *great E.*, but the sheaths are seldom above

8 or 9 lines long, at a considerable distance from each other, and have seldom more than about 10 lanceolate teeth, and are dark only in the upper part. Barren stems 1 to 2 feet high, with slender spreading branches, about 10 to 12 in each whorl; these are sometimes slightly branched, but never regularly so as in the wood *E*.

In fields and waste or moist places, throughout Europe and Russian Asia, from the Mediterranean to the Arctic regions, and in North America. Abundant in Britain. *Fr. spring*.

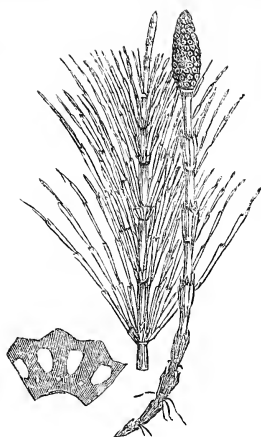


Fig. 1250.

3. Wood Equisetum. *Equisetum sylvaticum*, Linn.

(Fig. 1251.)

(Eng. Bot. t. 1874.)

Fruiting stems at first nearly simple, and about a foot high, but soon branched, like the barren ones. Sheaths about half an inch long, divided into about 6 or 8 lanceolate, scarious lobes, broader than in our other *Equisetums*. Spike about 6 to 8 lines long, obtuse. Branches, both of the barren and fertile stems, 10 to 16 or more in a whorl, very slender, but not above 2 or 3 inches long, and remarkable for bearing, at the lower nodes at least, whorls of 2, 3, or more smaller branches, which gives the plant a very elegant tufted appearance.

In wet woods, and shady places, in temperate and northern Europe and Russian Asia, from northern Italy and the Caucasus to the Arctic regions, and in North America. Spread all over Britain, but more abundant in Scotland and northern England and Ireland than in the south. *Fr. summer, or commencing in spring*.

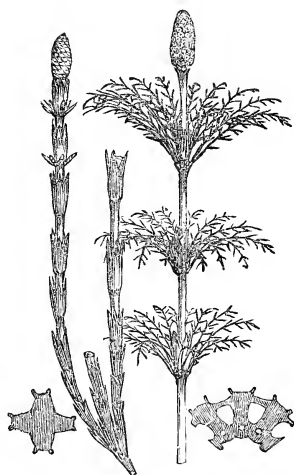


Fig. 1251.

4. Shady Equisetum. *Equisetum pratense*, Ehrh.
(Fig. 1252.)

(*E. Drummondii*, Eng. Bot. Suppl. t. 2777. *E. umbrosum*, Brit. Fl.)

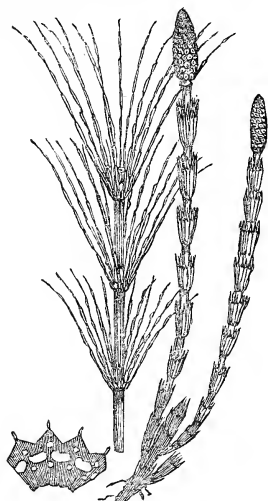


Fig. 1252.

Allied to the *wood E.* in stature and mode of growth; the fruiting stems at first simple, producing whorls of branches after the spike is developed; but the branches of both fruiting and barren stems are always simple, and the spike is larger. The fruiting stems at first resemble those of the *field E.*, but are much more slender. The sheaths have seldom less than 14, and usually about 20 striæ, and long, subulate teeth.

In moist woods, and shady places, generally distributed over the range of the *wood E.*, in Europe, Asia, and North America, but probably nowhere so common. Has been found in various parts of Scotland, northern and central England, and northern Ireland. *Fr. late in spring and summer.*

5. Smooth Equisetum. *Equisetum limosum*, Linn.

(Fig. 1253.)

(Eng. Bot. t. 929.)

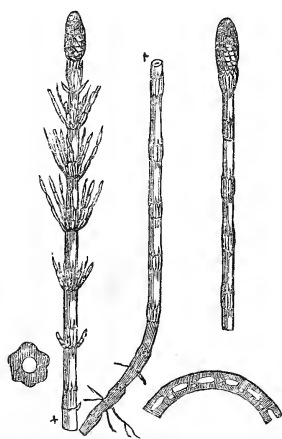


Fig. 1253.

Stems mostly fruiting, 1 to 2 feet high or more, all, including the barren ones, simple, or with few short, simple branches at the middle or upper nodes; the striæ usually about 12 to 20, not prominent. Sheaths about 3 or 4 lines long, with shortly subulate or pointed teeth. Spike about 6 to 9 lines long, obtuse.

In marshy places, wet ditches, or shallow waters, throughout Europe and Russian Asia, from the Mediterranean to the Arctic regions. Common in Britain. *Fr. summer.*

6. Marsh Equisetum. *Equisetum palustre*, Linn.

(Fig. 1254.)

(Eng. Bot. t. 2021.)

Stems mostly fruiting, but all nearly similar, erect, about 1 to 1½ feet high, much thinner than in the *smooth E.*, and marked with only about 6 to 8 prominent striæ or angles, and deep furrows; the branches but few in a whorl, not very long, and not so thin as in some species. Sheaths 3 or 4 lines, with as many pointed or shortly subulate teeth as striæ. Spike as in the *smooth E.*

In marshes and spongy bogs, in Europe and Russian Asia, from the Mediterranean to the Arctic regions, but perhaps not in North America. Common in Britain. *Fr. summer.*

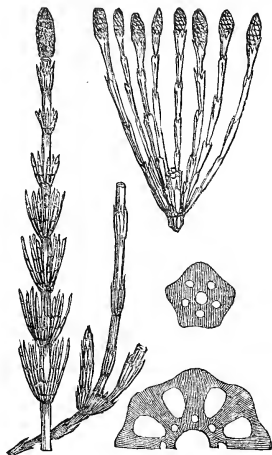


Fig. 1254.

7. Rough Equisetum. *Equisetum hyemale*, Linn.

(Fig. 1255.)

(Eng. Bot. t. 915. *Scouring Rush.*)

Stems mostly fruiting, but all similar and simple, or rarely with very few branches, 1 to 2 feet high or more, faintly marked with 15 to 20 striæ, and rough to the touch. Sheaths 3 to 5 lines long, white, with black rings round the top and the base; the teeth very minute and blunt, or rarely shortly subulate. Spike 6 to 9 lines long, with a little conical point on the rounded top.

In marshes and wet woods, in Europe and Russian Asia, extending from Spain and Italy to the Arctic regions, but more common in the north, and in North America. In Britain, chiefly in Scotland, Ireland, and northern and central England. *Fr. summer, rather late.*

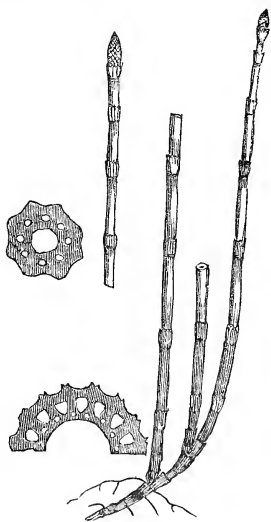


Fig. 1255.

8. Long Equisetum. *Equisetum ramosum*, Schleich.
(Fig. 1256.)

(*E. Mackayi*, Brit. Fl. *E. trachyodon* and *E. Moorei*, Bab. Man.)

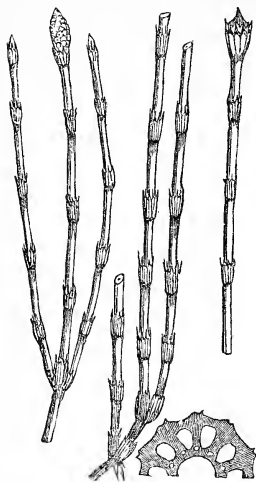


Fig. 1256.

Very near the *rough E.*, with the same little conical point to the spike, and very probably a mere variety, differing only in its slender stems, with only 8 to 12 or seldom more striæ; the sheaths have seldom any black ring round the base, though they often turn black altogether and the teeth have usually lanceolate, subulate points. The stem terminating the stock has usually a few long branches, especially from the lower whorls, and varies from 1 to 2 feet high or more; the lower stems are simple, slender, and shorter, all usually bearing a spike.

In sandy, moist places, generally dispersed over Europe and Russian Asia, but apparently rare in Britain, if indeed the British specimens be really distinct from the following. *Fr. summer, rather late.*

9. Variegated Equisetum. *Equisetum variegatum*,
Web. et Mohr. (Fig. 1257.)

(Eng. Bot. t. 1987.)

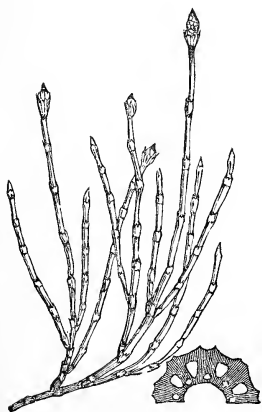


Fig. 1257.

This is again considered by some, and perhaps correctly, as a variety of the *rough E.* Stems slender, all simple, or very rarely branched, usually in several tufts, 6 to 8 inches high, but the terminal or central one sometimes lengthened out to 1 or 2 feet, with only 8 to 10 striæ; the sheaths short, with a conspicuous black ring, and short teeth. Spike seldom half an inch long, with a conical point as in the *rough E.*

In maritime sands, or on the sandy banks of rivers, sometimes quite in water, in the maritime or mountain districts of Europe and Russian Asia, especially in the north, and more rarely in North America. In Britain, chiefly in Scotland, Ireland, and the coasts of northern England. *Fr. summer, rather late.*

XC. THE FERN FAMILY. FILICES.

Herbs, with a perennial, short, or tufted, or creeping rootstock (in some exotic species growing up into a tall, woody stem), or rarely annual ; with radical or alternate leaves, which, as they also partake of the nature of branches, are distinguished by the name of *fronds*. In most genera these fronds are, when young, rolled inwards at the top, and the rootstock, and sometimes also the stalks of the fronds, are more or less covered with brown, scarios, usually pointed scales. Fructification consisting of capsules, called *spore-cases* (*sporangia*), sometimes small and almost dust-like, arranged either in clusters, called *sori*, on the under surface of the frond, and often covered when young, with a thin membrane, called the *indusium*, or in little involucre on the margin of the frond ; sometimes rather larger, in spikes or panicles at the top of the frond, which has, lower down, either leafy branches or one leaf. These capsules open in various ways to discharge the minute, usually microscopical spores.

A very large Order, abundantly diffused over the whole surface of the globe, especially in moist climates, although some species may be found in the chinks of the hottest rocks. The elegance of their foliage has of late years attracted as much interest in them on the part of cultivators and amateurs, as has their fructification and germination on the part of the physiologist. It has long been known that they can be reproduced from their spores, but it has only lately been ascertained that these spores when sown are developed into minute, green, leafy expansions, called *prothalli*, which alone have any analogy to the flowers of other plants. For on the prothallus are produced minute bodies, which have been compared to stamens and pistils, from whence the young Fern is subsequently developed. The spore may, under this theory, be said to be a young flower-bud, which only opens after it has fallen, the spore-case being an involucre enclosing innumerable buds, and the sorus a whole inflorescence.

The limitation of genera and species in the Ferns has always been a matter of great difficulty, and of late years their splitting and changing has been carried to such a degree as to throw the whole nomenclature into a state of utter confusion. The best characters are taken from the form and arrangement of the sori and of their indusium ; and some large genera, such as *Adiant*, *Spleenwort*, etc., are natural, and readily recognized ; but in *Polypody*, *Shield-Fern*, *Bladder-Fern*, etc.,

there is nothing in habit to serve as a guide, and the indusium of the two latter genera is often so evanescent that it requires the most careful examination of specimens, in exactly the proper state, to ascertain its existence. I have been induced, therefore, with a view to assist the beginner in the determination of the British species, to include in the following Table of Genera the species also of the most difficult ones, endeavouring to lead to them by more prominent characters, without reference to the more minute, although essential ones, which distinguish the genera. It must be recollected, however, that to determine Ferns they must be in fruit. It is hopeless to attempt to find out by books to what species a barren frond belongs, and monstrous developments, and deformed fronds, now not uncommon in cultivation, and found occasionally wild, are here wholly passed over.*

- | | | | |
|---|---|---|--------------------|
| 1 | { | Fructification in a terminal spike or panicle. The frond either leaf-like, or bearing a leaf in the lower part | 2 |
| | | Fructification in a little cup or involucre at the edge of the frond . . | 4 |
| | | Fructification on the back or under side of some or all the fronds . . | 5 |
| 2 | { | Fronds twice pinnate, usually 2 or more feet high, the fructification forming a panicle at their extremity | 3. OSMUND. |
| | | Frond stem-like, not 6 inches high, with a terminal spike or panicle | 3 |
| 3 | { | Spike simple. Leaf entire | 1. ADDER'S-TONGUE. |
| | | Spike branched into a panicle. Leaf pinnate | 2. MOONWORT. |
| 4 | { | Fronds numerous, scarcely 2 inches high, pinnate, with few deeply-lobed segments. Involucre ovate, 2 lobed | 17. HYMENOPHYLL. |
| | | Fronds 6 or 8 inches high, 2 or 3 times pinnate, with crowded segments. Involucres cup-shaped | 16. TRICHOMANES. |
| 5 | { | Fronds tufted, of 2 sorts, the central ones erect, fruiting, the outer ones barren, usually shorter, with broader lobes | 6 |
| | | Fruiting and barren fronds similar or nearly so | 8 |
| 6 | { | Fronds (stiff) simply pinnate, with entire lobes, the fruiting linear, the barren lanceolate | 11. BLECHNUM. |
| | | Fronds (delicate) much divided, with small, ovate or oblong, toothed lobes | 7 |
| 7 | { | Sori forming a line close to the margin of the frond | 5. ALLOSORUS. |
| | | Sori oblong, scattered on the surface of the frond | 6. GYMNOGRAM. |
| 8 | { | Fructification concealed by, or intermixed with chaffy scales or hairs . . | 9 |
| | | Fructification in lines along the margin of the fronds, the indusium a membrane attached to the margin | 10 |
| | | Fructification in circular, oblong, or linear sori, on the under surface, without chaffy scales | 11 |

* Further details of this beautiful tribe of plants may be found in the numerous illustrated works on Ferns which are daily advertised, among which Sir W. J. Hooker's beautifully illustrated volume, 'British Ferns and their Allies,' is the most recently published and most complete.

- 9 { Fronds deeply pinnatifid, with entire segments. Sori linear, concealed by the scales 10. CETERACH.
Fronds twice pinnate, with small segments. Sori circular, with chaffy hairs intermixed 15. WOODSIA.
- 10 { Tall, erect, stiff fern, ternately divided, with pinnate branches and sessile lobes 12. PTERIS.
Delicate fern, not a foot high, much divided, with broad, wedge-shaped lobes on capillary stalks 13. ADIANT.
- 11 { Sori oblong or linear, covered (when young) with a membrane attached along the side 12
Sori circular, either without any indusium, or covered (when young) with a membrane attached by the centre or by a lateral point . . . 13
- 12 { Frond entire. Indusium opening in a slit along the centre. 9. HART'S-TONGUE.
Frond pinnate or much divided. Indusium opening along the inner side 8. SPLEENWORT.
- 13 { Fronds simply pinnate, with entire or toothed segments or pinnae . . 14
Fronds pinnate, with pinnatifid primary divisions or pinnae, or twice or thrice pinnate* 15
- 14 { Segments narrow lanceolate, rather thick, attached to the stalk by a broad base, and confluent. Sori golden-yellow, without any indusium 4 (1). Common POLYPODY.
Segments distinct or stalked, ovate-falcate, prickly-toothed, with a prominent angle or lobe at the base on the inner side. Sori with a small, circular indusium 7 (1). Holly SHIELD-FERN.
Segments small, obovate. Indusium attached laterally. 8. SPLEENWORT.
- 15 { Lower pair of pinnae much larger than the others, giving the frond a broadly triangular or rhomboidal form 16
Lowest pair, or several lower pairs of pinnae, decreasing in size or not larger than the rest. Frond ovate or lanceolate in outline . . . 17
- 16 { Fronds once pinnate, with pinnatifid segments 4 (2). Beech POLYPODY.
Fronds twice pinnate, the pinnae mostly opposite 4 (4). Oak POLYPODY.
Fronds twice pinnate, the pinnae mostly alternate . 14. BLADDER-FERN.
- 17 { Fronds delicate, seldom a foot high, without any brown scarious scales (or very few at the base of the stalk), twice pinnate, with stalked pinnae 18
Fronds stiff, 1 to 3 feet high or more (except in the Beech Polypody). The stalk more or less shaggy below the leafy part, with brown scarious scales (except in the Marsh Shieldfern) 19
- 18 { Segments with fine pointed teeth 8. SPLEENWORT.
Segments oblong or lanceolate, nearly sessile, with obtuse teeth or lobes. 14. BLADDER-FERN.
Segments small, obovate, stalked, with obtuse teeth. Delicate annual. 6. GYMNOGRAM.

* In all twice or thrice pinnate leaves or fronds the primary divisions on each side of the main stalk are called *pinnae*, the ultimate divisions retaining the name of *segments*.

- 19 { Fronds pinnate, the pinnas deeply pinnatifid, the lobes entire, or obtuse
and slightly toothed 20
Fronds twice pinnate, the segments sharply toothed or pinnatifid . . 24
- 20 { Pinnae (all but the lowest pair) attached to the stalk by their broad
base 4 (2). *Beech* POLYPODY.
Pinnae attached by their midrib only 21
- 21 { Lobes of the pinnae entire. Sori near their margins 22
Lobes of the pinnae slightly toothed. Sori near their base or centre . 23
- 22 { No scarious scales on the stalk. No glands on the leafy part.
7 (3). *Marsh* SHIELDFERN.
Stalk with brown scarious scales at the base. Minute glands on the
under surface of the segments . . . 7 (4). *Mountain* SHIELDFERN.
- 23 { Segments of the pinnae oblong, very numerous, scarcely broader at the
base 7 (5). *Male* SHIELDFERN.
Segments ovate, wedge-shaped at the base . 7 (6). *Crested* SHIELDFERN.
- 24 { Segments of the pinnae with finely-pointed, almost prickly teeth; the
inner lobe or tooth at the base much larger than the rest.
7 (2). *Prickly* SHIELDFERN.
Segments of the pinnae with shortly pointed teeth or pinnatifid; the
lobes of each side similar 25
- 25 { Sori circular. No indusium 4 (3). *Alpine* POLYPODY.
Sori circular, with a kidney-shaped or almost peltate indusium attached
by a point 26
Sori rather oblong, with an indusium attached along one side.
8. *Spleenwort*.
- 26 { Segments ovate or ovate-lanceolate. Indusia conspicuous and persistent.
7 (6). *Crested* SHIELDFERN.
Segments oblong-lanceolate 27
- 27 { Indusia conspicuous and persistent. . . . 7 (8). *Rigid* SHIELDFERN.
Indusia small and often soon disappearing . 7 (7). *Broad* SHIELDFERN.

I. ADDER'S-TONGUE. OPHIOGLOSSUM.

Stem simple, bearing a single leaf in the lower part, and a simple terminal fruiting spike. Spore-cases rather large, closely sessile, in two opposite rows, each opening by a transverse fissure.

A genus of very few species, but widely distributed over most parts of the globe.

1. Common Adder's-tongue. *Ophioglossum vulgatum*, Linn. (Fig. 1258.)

(Eng. Bot. t. 108.)

Rootstock very small, but apparently perennial. Frond or stem solitary, from a few inches to near a foot high, with an ovate or oblong entire leaf, usually 2 to 3 inches long, narrowed at the base into a

shortly sheathing footstalk, and usually attached below the middle of the stem. Spike terminal, $\frac{3}{4}$ to about an inch long, bearing on each side from about 15 to 25 closely sessile spore-cases.

In moist meadows, and pastures, throughout Europe and Russian Asia, except the extreme north, in North America, and apparently also in the southern hemisphere as well as within the tropics. Generally distributed over Britain, but more common in some parts of England than in the north of Scotland. *Fr. summer.* The dwarf *A.* (*O. lusitanicum*, Linn.) is now believed to be a mere variety, only differing from the common form in its small size, the slender stems varying from 1 to 3 inches, the leaf linear or lanceolate, narrowed into a stalk, and seldom above $1\frac{1}{2}$ inches long. It is usually to be found only in early spring, and in Europe chiefly near the sea, in the Mediterranean region, and up the west coast of Europe to the Channel Islands, but not on the main British Isles.

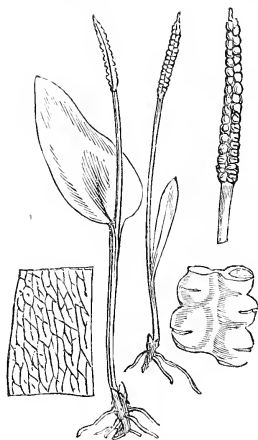


Fig. 1258.

II. MOONWORT. BOTRYCHIUM.

Stem of *Adder's-tongue*, but the leaf is divided, the terminal spike is branched, forming a panicle, and the spore-cases are globular, and, although sessile, quite distinct.

A small genus, distributed over the temperate regions of the northern hemisphere, and more sparingly in the southern one.

1. Common Moonwort. *Botrychium Lunaria*, Sw.

(Fig. 1259.)

(*Osmunda*, Eng. Bot. t. 318.)

Rootstock very small, bearing a single erect stem, 3 to 6 or 8 inches high, surrounded at the base by a few brown sheathing scales. The leaf about the centre of the stem, 1 to 3 inches long, pinnate, with from 5 to 15 or even more obliquely fan-shaped or halfmoon-shaped seg-



Fig. 1259.

ments, of a thick consistence, and entire or crenate. Panicle 1 to near 2 inches long, of a narrow pyramidal shape, the branches all turned towards one side.

In dry, hilly, or mountain pastures, in northern and Arctic Europe, Asia, and America, in the mountains of central and southern Europe, the Caucasus, and Altai, and reappearing in the Antarctic regions. Widely diffused over Britain, but not generally common. *Fr. summer.*

III. **OSMUND.** OSMUNDA.

Fronds once or twice pinnate, the leafy part barren; the fructification consisting of clustered spore-cases, either in a panicle at the end of the frond, or, in exotic species, in some other part of the frond, but always distinct from the leaf-like part; each spore-case opening by a vertical fissure.

A genus of few species, natives chiefly of the temperate regions of of both hemispheres, especially the northern one.

1. **Royal Osmund.** *Osmunda regalis*, Linn. (Fig. 1260.)

(Eng. Bot. t. 209.)

The perennial stock often forms a trunk rising perceptibly from the ground, and sometimes to the height of a foot or more. Fronds growing in tufts, erect, from a foot or two in dry, poor soils, to 8 or 10 feet when very luxuriant, twice pinnate, with lanceolate or oblong segments, 1 to 2 inches long, rather stiff, prominently veined, either entire or

obscurely crenate. Fructification forming a more or less compound panicle at the top of the frond, usually bipinnate, each spike-like branch representing a segment of the frond.

In moist or boggy places, in western, central, and some parts of southern and south-eastern Europe, extending northwards to southern Scandinavia; also in central Asia, North and South America, and southern Africa. In Britain, chiefly in the western counties of England and Scotland, in Wales, and Ireland, apparently very local in other parts of England, and entirely absent from several counties. *Fr. end of summer, or autumn.*



Fig. 1260.

IV. **POLYPODY.** POLYPODIUM.

Fronds (in the British species) either pinnate or ternately divided, with the branches pinnate. Spore-cases minute, collected in circular clusters or sori on the under side of the segments, without any indusium or involucre; each spore-case (as in all the following genera) encircled by an elastic jointed ring, and bursting irregularly on one side, having then, under a microscope, the appearance of a little helmet.

A large genus, widely distributed over the globe, only differing from *Aspidium* in the absence of any indusium or membrane covering the sori even when young. For the Table of Species, see the Generic Table above, p. 1033, n. 13.

1. **Common Polypody.** *Polypodium vulgare*, Linn.

(Fig. 1261.)

(Eng. Bot. t. 1149.)

Rootstock thick, woody, and creeping. Fronds about 6 inches to a foot high, of a firm consistence, without any scales on their stalk, broadly oblong-lanceolate or somewhat ovate in their general outline,



Fig. 1261.

simply pinnate or deeply pinnatifid; the linear-oblong segments adhering to the main stalk and usually connected with each other by their broad bases. Sori rather large, of a golden-yellow, in two rows along the under side of the upper segment. When bearing fruit these segments are usually entire or nearly so, and obtuse; when barren they are often slightly toothed; and monstrous states not unfrequently occur with the segments variously lobed or branched.

In sheltered places, on trunks of old trees, walls, moist rocks, and shady banks, throughout Europe and Russian Asia, from the Mediterranean to the Arctic regions, and in North America. Common in Britain. *Fr. summer and autumn.*

2. Beech Polypody. *Polypodium Phegopteris*, Linn. (Fig. 1262.)

(Eng. Bot. t. 2224, and *P. Thelypteris*, t. 1018.)

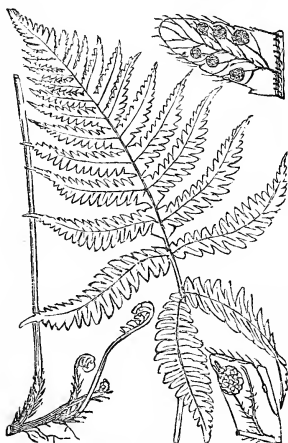


Fig. 1262.

Rootstock creeping. Fronds rather slender, 6 inches to a foot high or rather more, including their long stalks, broadly ovate-lanceolate and acuminate in their general outline, once pinnate; the segments deeply pinnatifid, narrow-lanceolate, gradually diminishing from the base to the end of the frond, and all, except sometimes the lowest pair, adhering to the main stem by their broad base. The midrib, principal veins, and margins of the frond more or less hairy on the under side, by which this species may be readily distinguished from the smaller specimens of the *marsh Shield-fern*, which it sometimes resembles. Sori rather small, near the margins of the lobes.

In moist situations, in hilly districts, in Europe and Russian Asia, from the Pyrenees and Alps to the Arctic regions and in North America. In Britain, chiefly in western and northern England, Scotland, and Ireland. *Fr. summer and autumn.*

3. Alpine Polypody. *Polypodium alpestre*, Hoppe.

(Fig. 1263.)

(*Pseudathyrium alpestre* and *P. flexile*, Bab. Man.)

Stock short, often forming several crowns. Fronds tufted, 1 to 3 feet high, twice pinnate; the segments numerous, oblong or lanceolate, deeply pinnatifid, and sharply toothed, the larger ones usually about half an inch long. Sori circular, without any indusium whatever: this character alone distinguishes this plant from the smaller states of the *lady Spleenwort* and from some forms of the *broad Shieldfern*, which it closely resembles in all other respects.

In the mountains of Europe and western Asia, from the Alps and the Caucasus to the Arctic regions. In Britain, only in the Highlands of Scotland. *Fr. summer.*

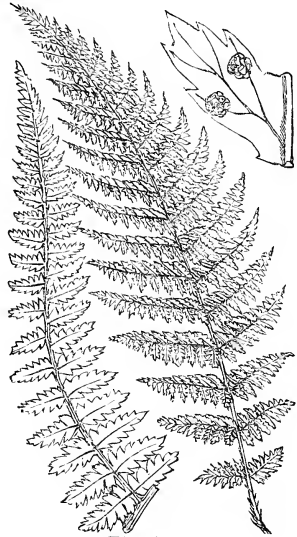


Fig. 1263.

4. Oak Polypody. *Polypodium Dryopteris*, Linn.

(Fig. 1264.)

(Eng. Bot. t. 616. *Oak Fern.*)

Rootstock creeping, rather slender. Fronds slender but erect, on long stalks, broadly triangular or rhomboidal in their general outline, the leafy part 4 to 6 inches long and at least as broad, twice pinnate, or rather, in the first instance, ternate; the lower pair of branches or pinnae on slender stalks, each often as large and as much divided as the rest of the frond; the others much smaller and less divided, the terminal ones reduced to small lobes. Segments thin, light-green, obtuse, slightly crenate, quite glabrous. Sori near the margins of the segments.



Fig. 1264.

In rather dry woods, in Europe and Russian Asia, from the Mediterranean to the Arctic regions, and in North America. Not uncommon in western, central, and northern England and Scotland, and occurs also in Ireland. *Fr. summer and autumn.* The *limestone Polypody* (*P. calcareum*, Eng. Bot. t. 1525, *P. Robertianum*, Bab. Man.) appears to be a mere variety of the *Oak P.*, of rather stouter growth, usually with rather less difference in size between the lower pair of pinnules and the succeeding ones, and has a minute, scaly or glandular meal on the frond-stalk and principal veins. It occurs here and there, in more open rocky situations than the common form, and especially in limestone districts.

V. ALLOSORUS. ALLOSORUS.

Delicate Ferns, with tufted, much divided fronds; the central ones erect and fruiting; the outer ones barren, with broader segments. Sori circular, but so close as to form compact lines along the margins, covered over when young by the thin edge of the frond itself.

A small genus, confined to the mountainous or northern districts of the northern hemisphere.

1. Curled Allosorus. *Allosorus crispus*, Bernh. (Fig. 1265.)

(*Pteris*, Eng. Bot. t. 1160. *Cryptogramma*, Brit. Fl. *Rock Brakes*, *Parsley Fern*.)

Stock densely tufted with brown scarious scales. Fronds 2 or 3 times pinnate, ovate or oblong in their general outline, on slender stalks almost without scarious scales; the outer barren ones about 5 or 6 inches high, somewhat resembling parsley-leaves, with numerous small, obovate

or wedge-shaped and deeply toothed segments. Fruiting fronds $\frac{3}{4}$ to 1 foot high, with equally numerous oblong or linear segments, the thin membranous edges turned down over the sori.

In the mountains of Europe, from the Pyrenees and Apennines to the Arctic regions, usually local, but often very abundant in particular spots. In Britain, chiefly in Scotland and northern England, but occurs also in central and western England and in Ireland. *Fr. summer.*



Fig. 1265.

VI. **GYMNOGRAM.** GYMNOGRAMMA.

Fronds much divided. Sori linear or oblong, simple or forked, not marginal, and without any indusium.

A considerable genus, chiefly tropical, including many of those elegant Ferns often seen in our hothouses, with a golden or silvery dust on the under side of the fronds.

1. **Small Gymnogram.** *Gymnogramma leptophylla*, Desv. (Fig. 1266.)

A delicate little Fern, resembling at first sight very small specimens of the *curled Allosorus*. Fronds in little tufts, although the whole plant is usually annual; the outer fronds short, with few broadly obovate or fan-shaped segments, often barren; the others erect, 2 to 6 inches high, with slender black stalks, twice pinnate, with numerous small, thin, obovate, deeply toothed or lobed segments. Sori oblong, at length nearly covering the under surface of the segments.

On moist shady banks, in the Mediterranean region and western Europe, extending eastward into central India,



Fig. 1266.

and northward up western France to the Channel Islands, the only station within our Flora. It reappears in the southern hemisphere. *Fr. spring and summer.*

VII. SHIELDFERN. ASPIDIUM.

Fronds (in the British species) once, twice, or thrice pinnate, with a stiff erect stalk, usually bearing, at least at the base, numerous brown scarious scales. Sori circular as in *Polypody*, but covered when young by a membrane or *indusium*, attached by the centre or by a point near one side, so that, when raised all round by the growth of the spore-cases, it becomes either peltate or kidney-shaped.

A very large genus, ranging over every part of the globe, only distinguished from *Polypody* by the indusium. In modern British Fern-books it is usually divided into two, *Lastrea* and *Polystichum*, according to whether the attachment of the indusium is central or towards the margin, a minute character, unconnected with habit, often difficult to appreciate, and sometimes inconstant. The Table of Species will be found under the Generic Table above, p. 1033, n. 13.

1. Holly Shieldfern. *Aspidium Lonchitis*, Sw.

(Fig. 1267.)

(*Polypodium*, Eng. Bot. t. 797, *Polystichum*, Bab. Man. *Holly Fern*.)

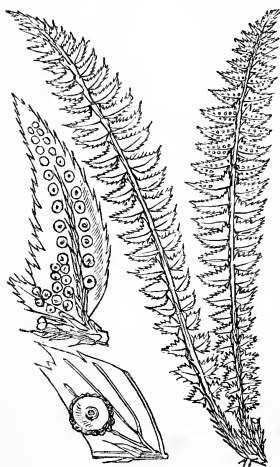


Fig. 1267.

Stock short and thick. Fronds tufted, usually 6 inches to a foot high or rather more, stiff, linear-lanceolate in their general outline, simply pinnate, leafy from the base, the common stalk very scaly below. Segments mostly broadly lanceolate or almost ovate, curved, prickly-toothed, enlarged at the base on the inner or upper side into a toothed angle or lobe, all nearly sessile, but attached by the midrib only, stiff, glabrous above, with a few scaly hairs underneath; the central ones about an inch long; the lower ones smaller and broader, often ovate. Sori circular, rather large, with a peltate indusium in the centre, which is however not very conspicuous.

In clefts of rocks, in all the great mountain regions of Europe and central

and Russian Asia, from Spain and Italy to the Arctic regions, and in North America. In Britain, only in the mountains of Scotland, northern England, North Wales, and Ireland. *Fr. summer and autumn.*

2. Prickly Shieldfern. *Aspidium aculeatum*, Linn.

(Fig. 1268.)

(Eng. Bot. t. 1562, and *A. lobatum*, t. 1563. *Polystichum*, Bab. Man.)

Fronds tufted, arising from a short thick stock, 1 to 2 feet or rather more high, stiff, twice pinnate, broadly lanceolate in outline, with the lower pinnae decreasing in length; the stalk below the leafy part 1 to 6 inches long, very shaggy with brown, scariosus scales. Primary branches or pinnae shaped like the whole frond of the *Holly S.* in miniature, being pinnate, with their segments shortly ovate-lanceolate, curved and prickly-toothed, with a prominent angle or lobe on the inner or upper side; the lower ones, or sometimes nearly all, attached by their midrib; the upper ones decurrent on the stalk or united at the base. Sori rather small, with a central but not very conspicuous indusium.

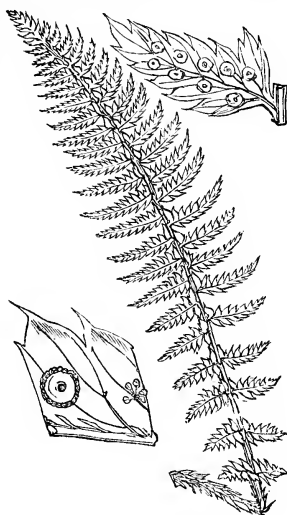


Fig. 1268.

On hedgebanks and in shady places, in temperate and southern Europe, from the Mediterranean to Scandinavia, extending eastward into central Asia; in North and South America, and generally in the southern hemisphere. Frequent in Britain. *Fr. summer and autumn.* The *angular S.* (*A. angulare*, Eng. Bot. Suppl. t. 2776) is a rather larger, more luxuriant, and less stiff variety, usually more divided, with more distinct segments, the lower ones evidently stalked.

3. Marsh Shieldfern. *Aspidium Thelypteris*, Sw.

(Fig. 1269.)

(*Lastrea*, Bab. Man. *Marsh Fern.*)

Rootstock creeping, with single, not tufted, erect fronds, as in the *Beech Polypody*, to which this Fern bears considerable resemblance.

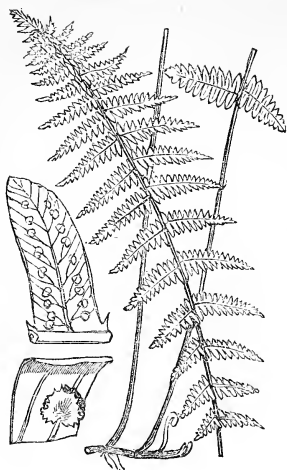


Fig. 1269.

and southern Scotland. *Fr.* summer and autumn.

It is taller, usually 1 to 2 feet high, quite glabrous, with a rather slender but stiff stalk, without scarious scales. The leafy part lanceolate, pinnate, with deeply pinnatifid pinnae, which are not crowded, and the lowest rather distant and smaller; all attached to the central stalk by their midrib or by a very short stalk; the lobes or segments entire, obtuse or scarcely pointed. Sori in lines near the edges, distinct at first, with an indusium attached near the edge, but soon covering nearly the whole under surface and concealing the indusium.

In boggy or marshy places, throughout Europe and Russian Asia, except the extreme north, and in North America, and perhaps also in the southern hemisphere. In Britain, usually very local, but dispersed over England, Ireland,

4. Mountain Shieldfern. *Aspidium Oreopteris*, Sw.

(Fig. 1270.)

(*Polypodium*, Eng. Bot. t. 1019. *Lastrea*, Bab. Man. *Sweet Mountain Fern*.)

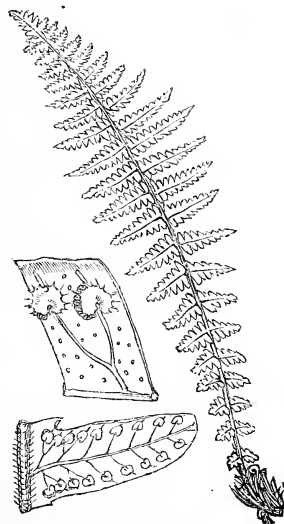


Fig. 1270.

The stature, mode of growth in circular tufts, and the general shape of the frond are those of the *male S.*, from which it may be distinguished by a lighter colour, especially of the stalk, and by the lobes or segments of the pinnae all quite entire, with the small sori in a line near the margin as in the *marsh S.* From the latter it differs in its larger size, the stalk bearing brown scarious scales, the pinnae so closely sessile as almost to lap over the central stalk; and from both this species may be known by the minute resinous or glandular dots on the under side of the fronds, from whence a fragrant smell is imparted to the plant when rubbed.

In mountain heathy districts, and

moist open woods, in temperate Europe, from northern Spain and Italy to Scandinavia, and eastward to Moscow. Generally dispersed over Britain, but more especially in Scotland, northern and western England, and in Ireland. *Fr. summer and autumn.*

5. Male Shieldfern. *Aspidium Filix-mas*, Sw. (Fig. 1271.)

(Eng. Bot. t. 1458. *Lastrea*, Bab. Man. *Male Fern*.)

Rootstock short but thick, woody, and decumbent or rising sometimes obliquely a few inches from the ground. Fronds handsome, in a large circular tuft, 2 or 3 feet high, stiff and erect, broadly lanceolate, with the lower pinnas decreasing, as in most *Shieldferns*, regularly pinnate; the pinnas deeply pinnatifid or pinnate; the segments regularly oblong, slightly curved, very obtuse, slightly toothed, connected at the base or the lowest ones distinct; the main stalk very shaggy with brown scarios scales. Sori rather large, near the base of the segments, with a conspicuous, nearly peltate or kidney-shaped indusium.

In woods and shady situations, along moist banks, etc., throughout Europe and central and Russian Asia, from the Mediterranean to the Arctic regions, and apparently in South America, but scarcely in North America. One of the commonest of British Ferns. *Fr. summer and autumn.* The barren fronds of young plants often resemble those of the *broad S.*, but the fruiting ones are almost always very distinct.

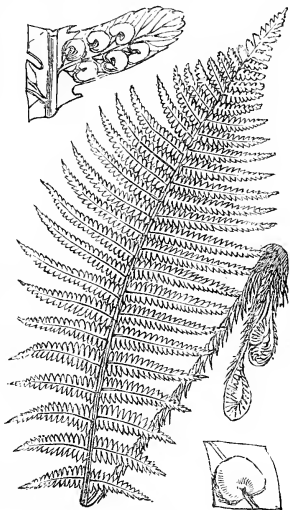


Fig. 1271.

6. Crested Shieldfern. *Aspidium cristatum*, Sw.

(Fig. 1272.)

(Eng. Bot. t. 2125. *Lastrea*, Bab. Man.)

Resembles in some respects the *male S.*, but the frond is less erect, the pinnas less regular, the segments broader, thinner, more wedge-shaped on the lower side, much more toothed, and the lower ones sometimes almost pinnatifid, the plant then forming some approach to the *broad S.*, from which it differs in the general shape of the

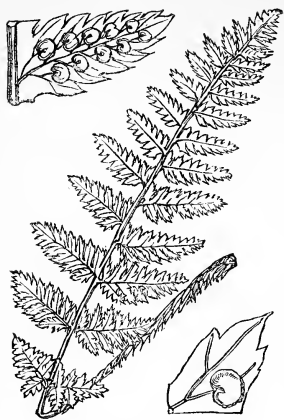


Fig. 1272.

frond much narrower, the segments much broader and much less divided. Sori large, with conspicuous indusiums as in the *male S.*

In moist or boggy places, in temperate Europe and western Asia, from the Pyrenees and northern Italy to Scandinavia, and in North America, but not generally common. In Britain, very local, but has been found in Norfolk and Suffolk, Nottinghamshire and Cheshire, and in North Wales. *Fr. summer and autumn.* Some specimens appear almost to connect it with the *male S.*, whilst others are difficult to distinguish from the *broad S.*

7. Broad Shieldfern. *Aspidium spinulosum*, Sw.

(Fig. 1273.)

(Eng. Bot. t. 1460. *A. dilatatum*, t. 1461. *Lastrea spinulosa*, *L. dilatata*, and *L. fæniseii*, Bab. Man.)

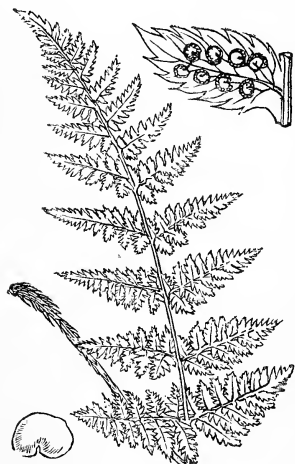


Fig. 1273.

The most variable of all our *Shieldferns*, allied to the *male S.*, but generally not so tall, of a paler green, and very much broader; the general outline nearly ovate, 1 to 2 feet long or rarely more, the lowest pair of pinnae not much shorter, or even longer than the others. The frond is also more divided, either twice pinnate, with the segments of the pinnae oblong-lanceolate and deeply toothed, or pinnatifid, or thrice pinnate; it then closely resembles the *lady Spleenwort* and the *alpine Polypody*, but may be generally distinguished by the lower pinnae not decreasing so much in size, and more accurately by the sori, which are circular, with a kidney-shaped indusium as in the *male S.*, although much smaller, and when mature the indusium often disappears.

In sheltered, shady places, on moist banks, in open, moist woods, etc.,

common in Europe and Russian Asia, from northern Spain and Italy to the Arctic regions. Abundant in Britain. *Fr. summer and autumn.* More than twenty varieties of this species have received distinct names, and three at least have been considered as species, but have no tangible characters to separate them.

8. Rigid Shieldfern. *Aspidium rigidum*, Sw. (Fig. 1274.)

(Eng. Bot. Suppl. t. 2724. *Lastrea*, Bab. Man.)

Very near the *broad S.*, of which it has the deeply toothed or pinnatifid, oblong-lanceolate segments, but the frond is stiffer and not so broad, and the sori are much larger, the two rows often occupying nearly the whole breadth of the segments, their indusiums conspicuous and persistent as in the *male S.* and the *crested S.*

In rocky situations, especially in limestone districts, in temperate Europe, from the Pyrenees to Norway, extending eastward into central Asia, and in North America. In Britain, chiefly in the limestone districts of northern England, but said to occur also in western England and Ireland. *Fr. summer and autumn.* Some botanists are of opinion that this and the two preceding species are but varieties of the *male S.*, into which they certainly appear (when seen growing in profusion) to pass, through numerous intermediate forms.

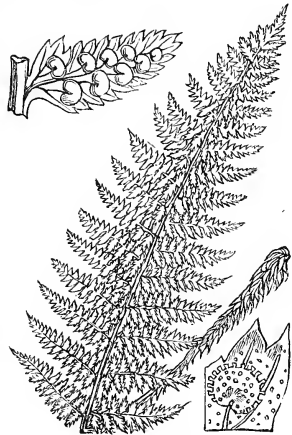


Fig. 1274.

VIII. SPLEENWORT. ASPLENIUM.

Fronds (in the British species) once, twice, or thrice pinnate or forked, usually rather stiff, though slender, and often small. Sori oblong or linear, on the under surface, usually diverging from near the centre of the segments, covered when young by a membrane or indusium, which opens outwards, being attached lengthwise along the outer side.

Widely dispersed over the globe, and one of the most natural among the large genera of *Ferns*, for although a few of the larger species are scarcely to be distinguished from some species of *Aspidium* and *Polypody*, except by the sori, the great majority have a peculiar dark-green, smooth appearance, which makes them easy to recognize.

Fronds twice or thrice pinnate, with numerous primary pinnae, the lowest or several lower pairs decreasing in size.

Frond 2 or 3 feet high, the longer pinnae 3 to 6 inches or more 1. *Lady S.*

Frond not a foot high, the longer pinnae seldom 1½ inches.

Broadest part of the frond above the middle. Ultimate segments broad, 1 to 1½ lines long 2. *Rock S.*

Broadest part below the middle. Ultimate segments broad, 2 to 3 lines long 3. *Lanceolate S.*

Fronds once pinnate, with numerous segments, the lower pairs decreasing in size.

Segments thick, ovate or lanceolate, ½ to 1 inch long or more 4. *Sea S.*

Segments thin, ovate or orbicular, under 5 lines long.

Stalk black 5. *Common S.*

Stalk green 6. *Green S.*

Fronds more or less divided, the lowest pinnae larger, on longer stalks, or more divided than the others.

Frond 6 inches to a foot, shining green, with numerous lanceolate pinnae and sessile segments 7. *Black S.*

Frond 3 or 4 inches, with a few small, stalked segments.

Segments obovate 8. *Wallrue S.*

Segments narrow-oblong 9. *Alternate S.*

Segments linear 10. *Forked S.*

1. Lady Spleenwort. *Asplenium Filix-fœmina*, Bernh.

(Fig. 1275.)

(*Aspidium*, Eng. Bot. t. 1459, not good.

Athyrium, Bab. Man. *Lady Fern*.)

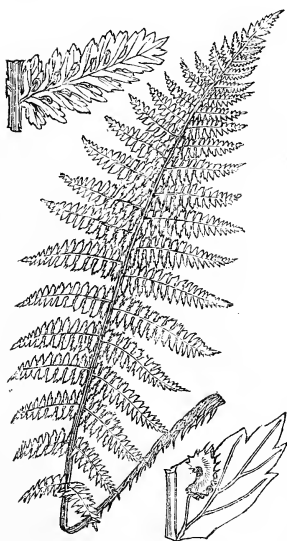


Fig. 1275.

A most elegant Fern, with the short, woody rootstock and circular tuft of fronds of the *male Shieldfern*, but more divided, the stalk less scaly, and the sori different. Fronds usually 2 to 3 feet high, broadly lanceolate, twice pinnate, the lower pairs of pinnae decreasing in size, the segments oblong-lanceolate and pinnatifid, with pointed teeth. Sori shortly oblong, diverging from the centre of the segments, with the indusium attached along one side as in other *Spleenworts*, but shorter, and the lower ones of each segment often slightly kidney-shaped, showing some approach to those of the *Shieldferns*.

In moist, sheltered woods, hedge-

banks, and ravines, throughout Europe and central and northern Asia, from the Mediterranean to the Arctic regions, and in northern and central America. Abundant in Britain. *Fr. summer and autumn.* It varies much in size and in the degree of division of its fronds, and between 30 and 40 forms have received names as varieties.

2. Rock Spleenwort. *Asplenium fontanum*, Bernh.

(Fig. 1276.)

(*Aspidium*, Eng. Bot. t. 2024.)

Fronds densely tufted, 3 to 5 inches high or near twice as much when very luxuriant, smooth and shining, oblong-lanceolate in their general outline, but the broadest part above the middle, twice pinnate; the longest primary pinnae seldom above half an inch long, their segments 1 to $1\frac{1}{2}$ lines, obovate, and deeply notched with 2 or 3 pointed teeth. Sori generally 2 or 3 only on each segment, shortly oblong, like those of the *lady S.*

On rocks and walls, in mountain districts, in central and southern Europe, extending probably into western Asia, but scarcely northward of the Jura, except as an introduced plant. In Britain, it has been found occasionally on walls in various parts of England, but probably not truly indigenous. *Fr. summer and autumn.*

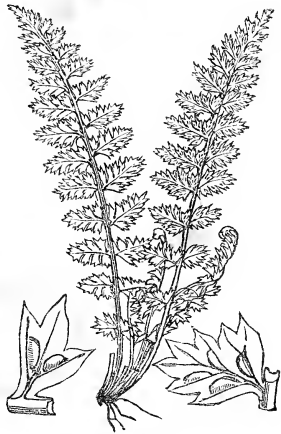


Fig. 1276.

3. Lanceolate Spleenwort. *Asplenium lanceolatum*, Huds.

(Fig. 1277.)

(Eng. Bot. t. 240.)

A low, tufted Fern, with twice-pinnate fronds, lanceolate in their general outline like the last, but with much larger segments. Fronds usually 3 to 6 inches high, rarely attaining a foot when luxuriant, the longest pinnae, rather below the middle of the frond, 1 to $1\frac{1}{2}$ inches long; the segments obovate or broadly oblong, narrowed at the base, but almost sessile, notched with a few pointed teeth. Sori 2 to 4 on



Fig. 1277.

each segment, oblong and distinct when young, but when old united in an irregular mass, covering the upper part of the segment.

On rocks and walls, in western Europe, chiefly near the sea, extending southward to Madeira, and northward to the English Channel. In Britain, not uncommon in the south-western and Welsh counties, and occurs also near Cork, in Ireland, and near Tunbridge Wells, in Kent. *Fr. summer and autumn.*

4. Sea Spleenwort. *Asplenium marinum*, Linn.

(Fig. 1278.)

(Eng. Bot. t. 392.)



Fig. 1278.

Fronds tufted, usually 6 inches to near a foot high, narrow-lanceolate in general outline, but coarser than in the *lanceolate S.*; the stems usually black, and only once pinnate. Segments obliquely lanceolate or nearly ovate, rather thick, obtuse, crenate, especially on the upper edge, narrowed at the base into a short stalk, the longer ones, in the middle of the frond, about an inch long. Sori several on each segment, linear, often above 2 lines long.

On rocks and walls, near the sea, in western Europe, extending southward to the Canary Islands, eastward to several spots along the Mediterranean, and northward to Britain, where it is abundant on several parts of the coast, even as far as the Orkneys. *Fr. the whole season.*

5. Common Spleenwort. *Asplenium Trichomanes*, Linn.

(Fig. 1279.)

(Eng. Bot. t. 576. *Maidenhair*, but not the true one. See *Adiant.*)

A neat little tufted Fern, usually 2 to 6 inches high, simply pinnate; the slender stalk usually black; with numerous obovate, orbicular or broadly oblong segments, nearly equal in size, those of the middle of the frond rather the largest, 2 to 3 or rarely 4 lines long, more or less toothed. Sori several on each frond, oblong-linear and distinct when young, but often uniting in a circular mass when old.

On walls and rocks, throughout Europe and central and Russian Asia, except the extreme north, in North and South America, and in Australia. Common in Britain. *Fr. the whole season.*

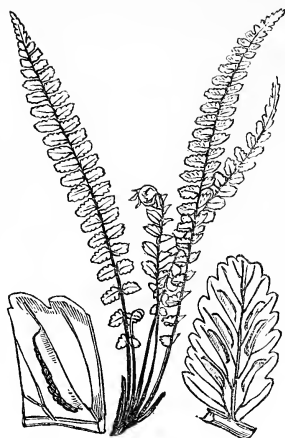


Fig. 1279.

6. Green Spleenwort. *Asplenium viride*. (Fig. 1280.)

(Eng. Bot. t. 2257.)

Very near the *common S.*, and considered, in the first edition of this Handbook, as a variety of it, and now admitted as a species only in compliance with general custom. It is usually less rigid, the segments rather shorter and broader, especially on the upper side, and the stalk is either entirely green or brown at the base only.

Among rocks in the mountains of central and northern Europe. Not uncommon in most mountainous districts of Britain. *Fr. the whole season.*



Fig. 1280.

7. Black Spleenwort. *Asplenium Adiantum-nigrum*, Linn.
(Fig. 1281.)

(Eng. Bot. t. 1950. *A. acutum*, Bab. Man.)



Fig. 1281.

Fronds tufted, usually 6 inches to a foot high, including the rather long, dark-brown or black stalk, the leafy part triangular or broadly lanceolate, of a dark shining-green, and firm consistence, twice pinnate, or the lower part three times; the pinnae gradually decreasing, and less divided from the lowest pair to the point; the segments varying from lanceolate to ovate or even obovate, sharply toothed or cut. Sori narrow-oblong or linear, sometimes, when old, covering nearly the whole surface.

On sandy hedgebanks, rocks, and old walls, in central and southern Europe and western and central Asia, extending northward to southern Scandinavia. Occurs also in some parts of the southern hemisphere. Common in Britain. *Fr. all summer and autumn.*

8. Wallrue Spleenwort. *Asplenium Ruta-muraria*, Linn.
(Fig. 1282.)

(Eng. Bot. t. 150. *Wall Rue.*)

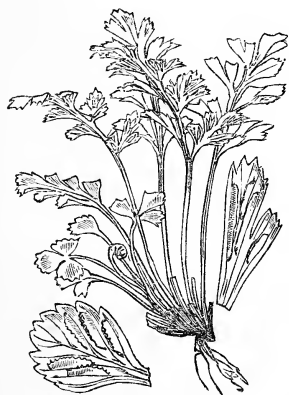


Fig. 1282.

Fronds densely tufted, usually 2 to 3 inches long, rather dark-green but not shining; the stalk more or less pinnately divided; the lower pinnae usually bearing 3 segments, the upper ones simple; the segments all stalked, obovate or broadly oblong, seldom above 2 lines long, and usually minutely toothed. Sori shortly linear, becoming united into broad patches when old.

On old walls, and rocks, throughout Europe and central and Russian Asia, except the extreme north, and in North America. Common in Britain, except in the Scotch Highlands, and some of the eastern districts. *Fr. the whole season.*

9. **Alternate Spleenwort.** *Asplenium germanicum*, Weis.
(Fig. 1283.)

(*A. alternifolium*, Eng. Bot. t. 2258.)

Very near the *Wallrue S.*, and perhaps a mere variety; but the segments are much narrower, usually narrow wedge-shaped or oblong, on short stalks; the whole frond narrow, usually simply pinnate, with the lower segments 3-lobed, or very rarely bearing 3 distinct segments; the segments entire or toothed at the summit. Sori few, long and narrow.

On rocks and old walls, dispersed over the greater part of Europe, from Spain to Scandinavia. Has been found in isolated localities in western and northern England, and southern Scotland. *Fr. summer and autumn.*

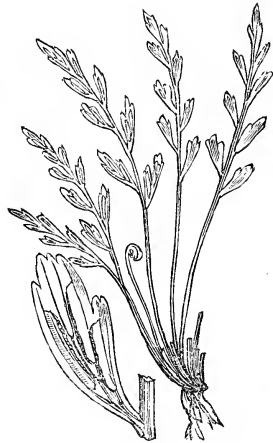


Fig. 1283.

10. **Forked Spleenwort.** *Asplenium septentrionale*, Hoffm.
(Fig. 1284.)

(Eng. Bot. t. 1017.)

This again is allied to the *Wallrue S.*, and has similar tufted fronds, 2 to 5 or 6 inches high; but the whole frond usually consists of a stalk, forked towards the top, each branch bearing a single, linear, entire or 2-lobed segment, about half an inch long, the linear sori occupying the whole under surface except the narrow pointed extremity. Some fronds have but a single entire or 3-lobed terminal segment, and a few have 3 distinct segments.

On rocks and old walls, in the mountainous districts of the greater part of Europe and central and Russian Asia, from Spain to Scandinavia, and in the mountains of North America. In Britain,



Fig. 1284.

in several of the western and northern counties of England and in southern Scotland, but not in Ireland. *Fr. summer and autumn.*

IX. **HART'S-TONGUE.** SCOLOPENDRIUM.

Fronds entire or lobed, with linear diverging sori as in *Spleenwort*, but the indusium is attached along both sides, opening in two valves by a longitudinal fissure along the centre.

The few species associated with our British one are from the tropics or the Mediterranean region.

1. **Common Hart's-tongue.** *Scolopendrium vulgare*, Sm.
(Fig. 1285.)

(Eng. Bot. t. 1150.)

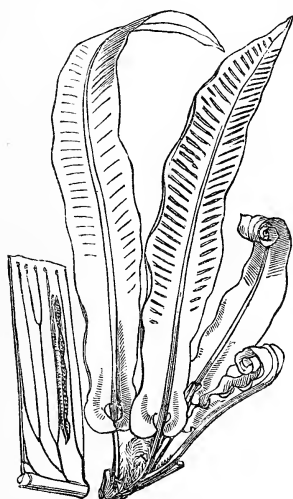


Fig. 1285.

Fronds tufted, undivided (except in monstrous forms), broadly linear or narrow-oblong, cordate at the base, with rounded auricles, usually about a foot long and $1\frac{1}{2}$ to 2 inches in the broadest part, of a firm consistence, smooth and shining on the upper surface, with a brown or greenish footstalk of about 2 to 4 or 5 inches. Sori numerous and parallel, in 2 rows, one on each side of the midrib, usually of very different lengths, but never reaching either to the midrib or to the edge of the frond.

On shady banks, rocks and walls, in ravines, etc., in temperate and southern Europe and west-central Asia, extending from the Mediterranean to the Baltic. Common in Britain. *Fr. the whole season.* It varies much in size, sometimes not 6 inches and occasionally attaining near 2 feet, and in the fantastic

forms assumed by the barren fronds when monstrous, especially under cultivation. No less than 58 of these forms are enumerated under Latin names in Moore's Handbook.

X. **CETERACH.** CETERACH.

Fronds pinnatifid or pinnate. Sori linear and diverging as in *Spleenwort*, but without any distinct indusium, and usually almost concealed under the scales of the under surface of the frond.

The genus is now limited to the European species and a second larger one from the Canary Islands.

1. **Scaly Ceterach.** *Ceterach officinarum*, Willd.
(Fig. 1286.)

(*Scolopendrium Ceterach*, Eng. Bot. t. 1244.)

Fronds tufted, spreading, about 2 to 6 inches long, deeply pinnatifid or pinnate, with broadly oblong or rounded lobes or segments attached by their broad base, green and glabrous on the upper side, but the under side thickly covered with brown scarious scales, which completely conceal the sori until they become very old.

On rocks and old walls, in central and southern Europe and west central Asia, extending northward to Holland. In Britain, common in many parts of England and Ireland, but rare in Scotland.
Fr. summer and autumn.



Fig. 1286.

XI. **BLECHNUM.** BLECHNUM.

Sori linear, one on each side of the midrib of each segment and parallel to it. Indusium attached along the outer edge of the sorus, opening outwards from the inner side.

A small genus, spread over many parts of the world, but chiefly tropical.

1. **Hard Blechnum.** *Blechnum Spicant*, Roth.
(Fig. 1287.)

(*B. boreale*, Eng. Bot. t. 1159.)

Fronds simply pinnate, tufted, of two kinds, the outer barren ones spreading, usually 6 inches to near a foot long; the segments lanceolate,

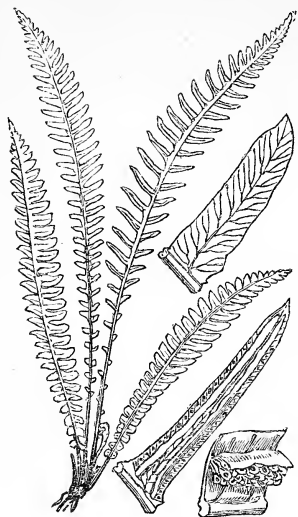


Fig. 1287.

curved, entire, attached by their broad base; those in the centre of the frond 1 to $1\frac{1}{2}$ inches long, gradually decreasing towards each end. Fruiting fronds in the centre of the tuft erect, 1 to $1\frac{1}{2}$ feet high; the segments of the same length as in the barren ones, but all narrow-linear; the under side entirely occupied by the 2 linear sori.

In woods, and rather moist stony places and heaths, generally distributed over Europe, extending from the Mediterranean far into Scandinavia, and occurs in several parts of Asia and Africa without the tropics. Common in Britain. *Fr. summer, rather late, and autumn.*

XII. **PTERIS.** PTERIS.

Fronds usually stiff, often large, lobed or pinnately divided. Veins of the segments branching from a midrib. Sori linear, close along the margin of the frond, with an indusium attached along its outer edge to the margin of the frond, and opening on the inner side.

A large genus, widely distributed over the globe, and if not very natural, at any rate easily recognized.

1. **Brake Pteris.** *Pteris aquilina*, Linn. (Fig. 1288.)

(Eng. Bot. t. 1679. *Brakes* or *Bracken*.)

A tall, erect, stiff Fern, with a thick, hard, creeping rootstock. Fronds 1 to 2 feet high in poor soils, 8 to 10 feet high when luxuriant, twice or thrice pinnate; the primary pinnae in pairs at some distance from each other; the lowest pair much larger, the others decreasing in size and successively developed, giving the whole frond, especially when young or small, a broadly triangular outline. Secondary

pinnae numerous, linear-lanceolate, deeply pinnatifid or pinnate, always ending in an undivided, crenate, blunt point. Segments ovate or oblong, obtuse and entire, attached by their broad base, of a firm consistence, glabrous above, often hairy underneath. Sori in continuous lines along the margins of the upper segments and summits of the secondary pinnae.

In woods and thickets, on heaths and waste places, dry or moist, but not swampy, in almost every part of the globe except the extreme north and south. Very abundant in Britain. *Fr. autumn.*



Fig. 1288.

XIII. **ADIANT.** ADIANTUM.

Fronds usually delicate and divided, the segments more or less wedge-shaped, with diverging forked veins, usually without a midrib. Sori oblong or linear, transverse at the ends of the lobes on the under side, with an indusium formed from the edge of the frond and opening outwards.

A considerable and well-marked genus, chiefly tropical.

1. **Maidenhair Adiant.** *Adiantum Capillus-Veneris*, Linn. (Fig. 1289.)

(Eng. Bot. t. 1564. *Maidenhair*.)

A very delicate tufted Fern. Fronds 6 inches to near a foot long, twice or thrice pinnate, usually broadly ovate in general outline, their slender stalk of a shining brownish-black. Segments obovate or fan-shaped, 4 to 8 lines broad, all narrowed at the base into a short, slender stalk, more or less divided into wedge-shaped, obtuse lobes, thin, and of a bright-green, without any midrib, but numerous forked veins converging at the base. Sori conspicuous, occupying the

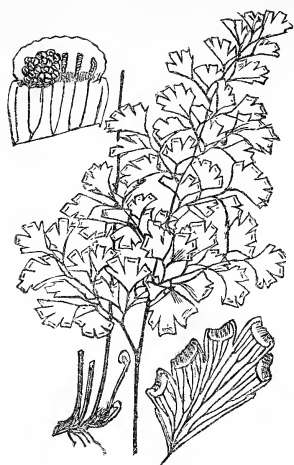


Fig. 1289.

extremities of most of the lobes of the segments.

In the fissures of moist rocks, at the entrance of caves and wells, and other situations sheltered from cold, as well as from sun and drought, in most of the tropical and warmer parts of the globe; common in southern Europe, extending northward over the greater part of France, but scarcely into Germany. In Britain, only in the south-western counties of England, in South Wales and Ireland. *Fr. all summer.*

XIV. **BLADDERFERN.** CYSTOPTERIS.

Delicate Ferns, with twice or thrice pinnate fronds. Sori small, circular on the under surface, enclosed, when young, in a very thin, globular or hood-shaped membrane, which opens out irregularly into a cup under one side, and often disappears early.

A small genus limited to the colder or mountainous regions of both hemispheres.

Fronds oblong-lanceolate, the lowest pinnae decreasing in size 1. *Brittle B.*

Fronds broadly triangular or rhomboidal, the lowest pair of

pinnae the largest 2. *Mountain B.*

1. **Brittle Bladderfern.** *Cystopteris fragilis*, Bernh. (Fig. 1290.)

(*Cyathea fragilis* and *dentata*, Eng. Bot. t. 1587 and 1588.)

Rootstock shortly creeping. Fronds tufted, usually under a foot long, oblong-lanceolate in their general outline, twice pinnate; the longest primary pinnae towards the middle of the frond, 1 to 1½ inches long, decreasing towards both ends. Stalks slender, without scales. Segments lanceolate, deeply pinnatifid, or the lower ones pinnate, with small, oblong, more or less crenate lobes, all obtuse, not

pointed, as in the *rock Spleenwort*, to the larger specimens of which this plant bears some resemblance.

On rocks and old walls, spread over the greater part of the globe, especially in mountainous districts, extending far into the Arctic regions. Dispersed over all Britain, and common in the hilly districts. *Fr. summer and autumn*. A closely allied species (if really distinct), from the Alps and Pyrenees, the *C. alpina* (*Cyathea incisa*, Eng. Bot. t. 163), is usually included in our Floras as having formerly existed on an old wall, at Low Layton, in Essex.



Fig. 1290.

2. Mountain Bladderfern. *Cystopteris montana*, Bernh. (Fig. 1291.)

Rootstock creeping. Fronds growing singly, twice or thrice pinnate, broadly triangular or rhomboidal in general outline, the pinnas of the lowest pair being considerably larger and more divided than the others, as in the *Oak Polypody*, which this plant much resembles. It is however of a more delicate texture, only 6 or 8 inches or rarely a foot high, including the long slender stalk; the pinnas are mostly alternate, with more divided, smaller segments, and the slender indusium over the sori is easily seen under a magnifying glass when young.

In moist, alpine situations, in northern and Arctic Europe, and in the great mountain-ranges of central and southern Europe, in the mountains of north-western America and Kamtchatka. In Britain, only in a few localities in the Highlands of Scotland. *Fr. summer*.



Fig. 1291.

XV. **WOODSIA.** WOODSIA.

Small, tufted, pinnately-divided Ferns, with brown scarious scales or hairs on the under surface. Sori circular, surrounded by or intermixed with a fringe of chaffy hairs, proceeding from the minute indusium concealed under the sorus.

A small genus, still more strictly confined than the last to high northern or southern latitudes, or to great elevations.

1. **Alpine Woodsia.** *Woodsia ilvensis*, Br. (Fig. 1292.)

(Eng. Bot. Suppl. t. 2616, and *Polypodium hyperboreum*, t. 2023.)



Fig. 1292.

Stock densely tufted. Fronds spreading, 2 to 4 or rarely 6 inches long, twice pinnate, oblong-lanceolate in outline; the longer primary pinnae in the middle of the frond 6 to 9 lines long, the lower ones decreasing; all pinnate or pinnatifid, with small obtuse segments, rather thick, green and glabrous, or hairy above, more or less covered underneath with brown scarious scales or chaffy hairs.

On alpine rocks, in northern and Arctic Europe, Asia, and America, and in the great mountain-chains of central and southern Europe, and central Asia. Rare in Britain, and only in the mountains of Scotland, northern England, and North Wales. *Fr. summer.* The *round-leaved W.* (*W. hyperborea*, Br.), usually considered as a distinct species, but probably a variety only of the *alpine W.*, differs

in its more tender texture, a greener colour, the segments shorter and less deeply divided with more rounded lobes, and the scarious scales less numerous, narrower and paler coloured. Its range is nearly the same as that of the ordinary form, but it is generally much more rare.

XVI. **TRICHOMANES.** TRICHOMANES.

Delicate, half-pellucid Ferns, usually of a dark green. Fructification consisting of little cup-shaped involucres, sessile upon or partly

immersed in the edge itself of the frond. In the centre of the involucre is a little bristle, often projecting beyond it, round the base of which are attached the minute capsules or spore-cases.

A large genus, widely spread over the warmer regions of the globe, but more especially in tropical America.

1. **European Trichomanes.** *Trichomanes radicans*, Sw.
(Fig. 1293.)

(*Hymenophyllum elatum*, Eng. Bot. t. 1417. *Bristle Fern*.)

Rootstock creeping, often to a considerable extent. Fronds usually 6 to 8 inches high, including the rather long stalk; broadly ovate-lanceolate in general outline, twice or thrice pinnate, of a dark-green, with rather stout stalks and branches. Segments numerous and crowded, thin, pellucid, oblong, more or less toothed, narrowed at the base. Involucres in the axils of the small ultimate segments or lobes, cylindrical, about a line long, the central bristle projecting $\frac{1}{2}$ to 1 line more.

In moist, sheltered, shady places, widely distributed over the tropical and hotter regions of both hemispheres, but in Europe only in a few localities in western Spain and Ireland, and recently found in the Snowdon range, by Mr. J. F. Rowbotham, and the isle of Arran, by Mr. J. Combe. *Fr. summer*.



Fig. 1293.

XVII. **HYMENOPHYLL.** HYMENOPHYLLUM.

Half-pellucid Ferns, closely resembling *Trichomanes*, but usually smaller; the involucres deeply divided into 2 lobes, and the bristle or receptacle usually concealed within them.

A large genus, with nearly the same range as *Trichomanes*.

1. Tunbridge Hymenophyll. *Hymenophyllum tunbridgense*, Linn. (Fig. 1294.)

(Eng. Bot. t. 162. *Filmy Fern*.)

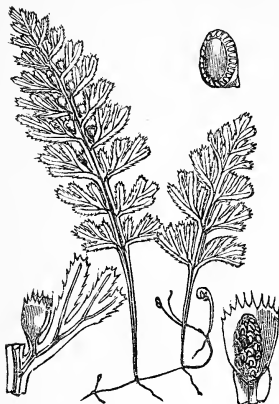


Fig. 1294.

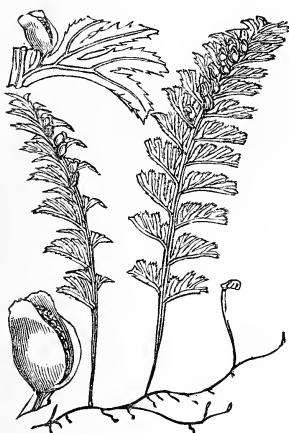


Fig. 1295.

Rootstock very slender, creeping, and much branched with numerous fronds, forming broad, dense, almost moss-like patches. Fronds pinnate, seldom above 2 or 3 inches long, lanceolate in general outline; the stem very slender; the segments deeply divided into 3 to 8 or more oblong linear lobes, which appear minutely toothed when seen through a lens. Involucres at the base of the segments or their lobes, on their inner edge, ovate, about a line long, deeply divided into 2 flattish lobes, often minutely toothed round the edge.

In moist, rocky, or shady situations, dispersed over most of the warmer mountain districts of the old world, especially in the southern hemisphere; more rare in America, extending from the Canary Islands and north-western Africa along western Europe to Belgium and Norway, but not recorded from eastern Europe or any part of the Russian dominions, nor from North America. Generally distributed over the greater part of Britain, but more frequent in Scotland, northern and western England, and Ireland, than in eastern England. *Fr. summer and autumn.* A variety with the valves of the involucre entire, not toothed, is usually distinguished as a species, under the name of *H. unilaterale* or *H. Wilsoni*, Fig. 1295 (Eng. Bot. Suppl. t. 2686), but the other characters, said to accompany this one, such as the narrower involucres, the different direction of the lobes of the fronds, etc., do not appear to

me to be so constant as they are supposed to be, and the teeth of the valves, when present, are very variable. The entire-valved form is the most common in Scotland and Ireland, but the two are often intermixed.

INDEX OF SUBSTANTIVE NAMES.



INDEX OF SUBSTANTIVE NAMES,

ORDINAL, GENERIC, AND POPULAR.

The names of the Families and Genera, both English and Latin, adopted in the Work, are printed in Roman letters.

All synonyms, popular names, and names of Families or Genera only incidentally referred to, are printed in Italics.

The Second Volume commences with the Campanula Family, p. 505.

PAGE	PAGE	PAGE
Abele 768	Ajuga 674	<i>American Cowslip</i> . . . 536
<i>Absinth</i> 438	<i>Alaternus</i> 178	<i>Ammophila</i> 964
<i>Abutilon</i> 151	Alchemil 256	<i>Amygdalus</i> 236
<i>Acacia</i> 181, 182	Alchemilla 256	<i>Anacharis</i> 801
<i>Acanthus</i> Fam. 602	Alder 750	Anagallis 545
Acer 175	<i>Alexanders</i> 371	Achusa 584
Aceraceæ 174	<i>Algæ</i> 1018	Andromeda 523
Aceras 827	Alisma 795	Anemone 6
Achillea 432	<i>Alisma</i> 798	<i>Anethum</i> 347, 354
<i>Achimenes</i> 603	<i>Alisma</i> Fam. 793	Angelica 353
Aconite 23	Alismaceæ 793	<i>Angelonia</i> 604
Aconitum 23	Alkanet 584	<i>Aniseed</i> 338
Acorus 780	<i>Alkanet</i> 578	<i>Antennaria</i> 440
Actæa 24	<i>Allamanda</i> 556	Anthemis 429
<i>Actinocarpus</i> 798	<i>All-heal</i> 399	<i>Anthericum</i> 853
Adder's-tongue . . . 1034	Alliaria 58	Anthoxanth 949
Adiant 1057	Allium 859	Anthoxanthum 949
Adiantum 1057	Allosorus 1040	<i>Anthriscus</i> 362, 363, 364
Adonis 8	Allseed 151	Anthyllis 211
Adoxa 378	<i>Almond</i> 236	Antirrhinum 608
<i>Ægilops</i> 983	Alnus 750	<i>Antirrhinum</i> 610-614
<i>Ægopodium</i> 332	<i>Aloe</i> 837	<i>Apargia</i> 479
<i>Æsculus</i> 174	<i>Alonsoa</i> 604	<i>Apera</i> 963
<i>Æthusa</i> 346	Alopecurus 955	Apium 326
<i>Agapanthus</i> 844	<i>Alsine</i> 118	Apocynaceæ 556
<i>Agave</i> 837	<i>Alstræmeria</i> 837	<i>Aporanthes</i> 195
<i>Ageratum</i> 413	Althæa 155	<i>Apple</i> 267
<i>Agraphis</i> 858	Alyssum 68	<i>Apricot</i> 236
Agrimonia 260	<i>Alyssum</i> 73	Aquifoliaceæ 552
Agrimony 260	<i>Amaranth</i> 691	Aquilegia 21
<i>Agrimony</i> 413	<i>Amaranth</i> Fam. 691	Arabis 47
<i>Agropyrum</i> 983	<i>Amarantaceæ</i> 691	<i>Aralia</i> 373
<i>Agrostemma</i> 111, 113	<i>Amarantus</i> 691	<i>Aralia</i> Fam. 373
Agrostis 961	Amaryllideæ 837	<i>Araliaceæ</i> 373
<i>Agrostis</i> 960	<i>Amuryllis</i> 837	Arbutus 521
Aira 967	<i>Amaryllis</i> Fam. 837	<i>Arbutus</i> 522, 523
<i>Aira</i> 1011, 1015	Amentaceæ 747	<i>Archangel</i> 671

	PAGE		PAGE		PAGE
<i>Archangelica</i>	354	<i>Bamboo</i>	938	<i>Bladderwort</i>	550
<i>Arctium</i>	457	<i>Baneberry</i>	24	<i>Blechnum</i>	1055
<i>Arctostaphylos</i>	522	<i>Barbarea</i>	44	<i>Blinks</i>	136
<i>Ardisia</i>	536	<i>Barberry</i>	26	<i>Bluebell</i>	858
<i>Arenaria</i>	118	<i>Barberry Fam.</i>	25	<i>Bluebottle</i>	472
<i>Arenaria</i>	132	<i>Barckhausia</i> , see <i>Borck-</i>		<i>Blysmus</i>	891
<i>Argemone</i>	29	<i>hausia</i> .		<i>Bog Asphodel</i>	866
<i>Aristolochia</i>	726	<i>Barley</i>	980	<i>Bog Rush</i>	887
<i>Aristolochia Fam.</i>	726	<i>Bartsia</i>	631	<i>Borage</i>	587
<i>Aristolochiaceæ</i>	726	<i>Basil</i>	642, 651	<i>Borage Fam.</i>	573
<i>Armeria</i>	679	<i>Basil-Thyme</i>	653	<i>Boraginæ</i>	573
<i>Armoracia</i>	47, 67	<i>Bastard Alkanet</i>	578	<i>Borago</i>	587
<i>Arnoseris</i>	501	<i>Bastard Stone Parsley</i> .	329	<i>Borckhausia</i>	490, 491
<i>Aroides</i>	778	<i>Bastard Toadflax</i> . . .	725	<i>Botrychium</i>	1035
<i>Arrhenatherum</i>	973	<i>Bauhinia</i>	180	<i>Bouvardia</i>	386
<i>Arrow-grass</i>	799	<i>Bay-tree</i>	723	<i>Box</i>	737
<i>Arrowhead</i>	794	<i>Beaksedge</i>	889	<i>Brachypodium</i>	986
<i>Artemisia</i>	435	<i>Beam-tree</i>	268	<i>Brakes</i>	1056
<i>Arthrolobium</i>	216	<i>Bean</i>	182	<i>Bramble</i>	244
<i>Artichoke</i>	413	<i>Bearberry</i>	522	<i>Brassica</i>	61
<i>Arum</i>	779	<i>Beargrass</i>	959	<i>Brassica</i>	60
<i>Arum Fam.</i>	778	<i>Bear's-foot</i>	20	<i>Bringall</i>	593
<i>Arundo</i>	1016	<i>Beech</i>	754	<i>Bristle Fern</i>	1061
<i>Arundo</i>	964-967	<i>Bee Orchis</i>	828	<i>Briza</i>	999
<i>Asarabacca</i>	726	<i>Beet</i>	700	<i>Broccoli</i>	64
<i>Asarum</i>	726	<i>Belladonna</i>	595	<i>Brome</i>	988
<i>Asclepias Fam.</i>	556	<i>Bellis</i>	424	<i>Bromeliaceæ</i>	844
<i>Ash</i>	554	<i>Bents</i>	961, 998	<i>Bromus</i>	988
<i>Asparagus</i>	849	<i>Benthamia</i>	376	<i>Bromus</i>	956, 987
<i>Aspen</i>	769	<i>Berberideæ</i>	25	<i>Brooklime</i>	625
<i>Asperugo</i>	588	<i>Berberis</i>	26	<i>Brookweed</i>	547
<i>Asperula</i>	394	<i>Berteroa</i>	69	<i>Broom</i>	186
<i>Asphodel</i>	844, 866, 867	<i>Beta</i>	700	<i>Broom</i>	182
<i>Aspidium</i>	1042	<i>Betonica</i>	661	<i>Broomrape</i>	596
<i>Aspidium</i>	1048, 1049	<i>Betony</i>	661	<i>Broomrape Fam.</i> . . .	595
<i>Asplenium</i>	1047	<i>Betula</i>	751	<i>Browallia</i>	604
<i>Aster</i>	415	<i>Bidens</i>	455	<i>Brugmansia</i>	591
<i>Astragal</i>	212	<i>Bignonia Fam.</i>	602	<i>Brunsfelsia</i>	604
<i>Astragalus</i>	212	<i>Bilberry</i>	519	<i>Bryonia</i>	290
<i>Astragalus</i>	215	<i>Bindweed</i>	569, 570, 717	<i>Bryonia</i>	290
<i>Astrantia</i>	323	<i>Birch</i>	751	<i>Bryony</i>	841
<i>Athamanta</i>	348	<i>Birdcherry</i>	238	<i>Buckbean</i>	565
<i>Athyrium</i>	1048	<i>Bird's-foot</i>	217	<i>Buckthorn</i>	178
<i>Atriplex</i>	701	<i>Bird's-foot Trefoil</i> . .	209	<i>Buckthorn</i>	724
<i>Atropa</i>	535	<i>Bird's-nest</i>	535, 813	<i>Buckthorn Fam.</i> . . .	178
<i>Aubrietia</i>	42	<i>Bishopweed</i>	333	<i>Buckwheat</i>	715, 717
<i>Aucuba</i>	376	<i>Bistort</i>	718	<i>Bugle</i>	674
<i>Avena</i>	970	<i>Bittercress</i>	51	<i>Bugloss</i>	585
<i>Acena</i>	973	<i>Bittersweet</i>	593	<i>Bugloss</i>	574
<i>Avens</i>	241	<i>Blackberry</i>	244	<i>Bullace</i>	237
<i>Awlwort</i>	74	<i>Black Bindweed</i>	717	<i>Bulrush</i>	775
<i>Azulea</i>	518, 524	<i>Black Bryony</i>	841	<i>Bulrush Fam.</i>	775
		<i>Black Horehound</i>	666	<i>Bunias</i>	86
<i>Bachelor's Buttons</i> . . .	10	<i>Black Saltwort</i>	544	<i>Bunium</i>	361
<i>Baldmoney</i>	351	<i>Blackthorn</i>	236	<i>Bunium</i>	335
<i>Ballota</i>	666	<i>Bladderfern</i>	1058	<i>Buplever</i>	339
<i>Balm</i>	642, 653	<i>Bladdernut</i>	175	<i>Buplevrum</i>	339
<i>Balsam</i>	172	<i>Bladder Senna</i>	182	<i>Burdock</i>	457

	PAGE		PAGE		PAGE
<i>Bur Marigold</i>	455	<i>Carnation-grass</i>	930	<i>Chickweed</i> 125, 128, 130, 136	
<i>Burnet</i>	258, 259	<i>Carpinus</i>	753	<i>Chicory</i>	501
<i>Burnet Saxifrage</i>	338	<i>Carrot</i>	368	<i>Chimonanthus</i>	272
<i>Bur-reed</i>	777	<i>Carum</i>	333	<i>Chionanthus</i>	554
<i>Burweed</i>	456	<i>Caryophyllaceæ</i>	100	<i>Chironia</i>	560
<i>Butcher's Broom</i>	850	<i>Cassia</i>	180	<i>Chives</i>	862
<i>Butome</i>	794	<i>Castanea</i>	749	<i>Chlora</i>	565
<i>Butomus</i>	794	<i>Catabrosa</i>	1010	<i>Chorizema</i>	182
<i>Butterbur</i>	415	<i>Catalpa</i>	603	<i>Christmas Rose</i>	20
<i>Buttercups</i>	10, 15	<i>Catananche</i>	413	<i>Chrysanthemum</i>	425
<i>Butterwort</i>	548	<i>Catchfly</i>	106, 107, 109	<i>Chrysocoma</i>	419
<i>Buxus</i>	737	<i>Catkin Fam.</i>	747	<i>Chrysosplenium</i>	313
<i>Cabbage</i>	64	<i>Catmint</i>	656	<i>Chrysosplenium</i>	313
<i>Cachrys</i>	352	<i>Cat's-ear</i>	440, 482	<i>Cicely</i>	360
<i>Cactus Fam.</i>	292	<i>Cat's-tail</i>	775, 953	<i>Cicendia</i>	559
<i>Cæsalpinia Tribe</i>	180	<i>Caucalis</i>	365	<i>Cichorium</i>	501
<i>Cakile</i>	85	<i>Cauliflower</i>	64	<i>Cicuta</i>	326
<i>Calamagrostis</i>	965	<i>Cayenne Pepper</i>	591	<i>Cineraria</i>	447, 452, 453
<i>Calamint</i>	652	<i>Ceanothus</i>	178	<i>Cinquefoil</i>	250
<i>Calamintha</i>	652	<i>Cedar</i>	772, 773	<i>Circea</i>	282
<i>Calandrinia</i>	135	<i>Celandine</i>	33	<i>Cirsium</i>	460
<i>Calendula</i>	413	<i>Celandine (Lesser)</i>	12	<i>Cistaceæ</i>	91
<i>Calceolaria</i>	604	<i>Celastraceæ</i>	177	<i>Cistus</i>	91, 92, 93
<i>Calliandra</i>	181	<i>Celastrus Fam.</i>	177	<i>Cistus Fam.</i>	91
<i>Callitriche</i>	740	<i>Celery</i>	327	<i>Cladium</i>	888
<i>Callitriche Fam.</i>	739	<i>Celosia</i>	691	<i>Clarkia</i>	273
<i>Callitrichineæ</i>	739	<i>Centaurea</i>	470	<i>Claytonia</i>	135
<i>Calluna</i>	527	<i>Centaur</i>	560	<i>Cleavers</i>	393
<i>Calochortus</i>	844	<i>Centranth</i>	397	<i>Clematis</i>	3
<i>Caltha</i>	18	<i>Centranthus</i>	397	<i>Clinanthus</i>	182
<i>Calycanthus</i>	272	<i>Centuncule</i>	546	<i>Clinopodium</i>	654
<i>Camelina</i>	73	<i>Centunculus</i>	546	<i>Cloudberry</i>	247
<i>Camomile</i>	429	<i>Cephalanthera</i>	810	<i>Clover</i>	196
<i>Camomile</i>	428	<i>Cerast</i>	124	<i>Clubmoss</i>	1020
<i>Campanula</i>	510	<i>Cerastium</i>	124	<i>Clubmoss Fam.</i>	1018
<i>Campanula Fam.</i>	505	<i>Cerastium</i>	128	<i>Cnicus</i>	464-468
<i>Campanulaceæ</i>	505	<i>Ceratophyll</i>	739	<i>Colæa</i>	567
<i>Campion</i>	106, 107, 112	<i>Ceratophyllum</i>	739	<i>Colnut</i>	754
<i>Canary-seed</i>	951	<i>Cercis</i>	180	<i>Cochlearia</i>	67
<i>Candytuft</i>	77	<i>Cestrum</i>	591	<i>Cock's-comb</i>	691
<i>Cannabis</i>	741	<i>Ceterach</i>	1055	<i>Cock's-foot</i>	997
<i>Cantebury Bell</i>	511	<i>Cherophyllum</i>	362	<i>Codlins-and-Cream</i>	275
<i>Cantua</i>	567	<i>Chaffweed</i>	546	<i>Coffea</i>	386
<i>Caprifoliaceæ</i>	378	<i>Chamagrostis</i>	958	<i>Colchicum</i>	868
<i>Capsel</i>	79	<i>Chamomile, see Camo-</i>		<i>Coleus</i>	642
<i>Capsella</i>	79	<i>mile</i>	429	<i>Collinsia</i>	604
<i>Capsicum</i>	591	<i>Chara</i>	1018	<i>Collomia</i>	567
<i>Caragana</i>	182	<i>Charlock</i>	65, 87	<i>Colt's-foot</i>	414
<i>Caraway</i>	334	<i>Cheiranthus</i>	43	<i>Columbine</i>	21
<i>Cardamine</i>	51	<i>Chelidonium</i>	33	<i>Colutea</i>	182
<i>Cardamine</i>	51	<i>Chelidonium</i>	33, 34	<i>Colza</i>	64
<i>Cardoon</i>	413	<i>Chenopodiaceæ</i>	690	<i>Comarum</i>	254
<i>Carduus</i>	466	<i>Chenopodium</i>	693	<i>Comfrey</i>	586
<i>Carex</i>	905	<i>Chenopodium</i>	692	<i>Compositæ</i>	407
<i>Carlina</i>	470	<i>Cherleria</i>	117	<i>Composite Fam.</i>	407
<i>Carlina</i>	470	<i>Cherry</i>	237	<i>Conferva</i>	1018
<i>Carnation</i>	103	<i>Chervil</i>	362	<i>Coniferæ</i>	770
		<i>Chestnut</i>	749	<i>Conium</i>	369

PAGE		PAGE		PAGE	
Convallaria	847	Crosswort	388	Devil's-bit	405
Convallaria	845, 846, 847	Crowberry	738	Dewberry	246
Convolvulaceæ	566	Crowfoot	15	Dianthus	102
Convolvulus	569	Cruciferae	38	Dicotyledons	1
Convolvulus Fam.	566	Crucifer Fam.	38	Dictamnus	174
Conyza	422	Cryptogams	1017	Dielytra	35
Corallorhiza	807	Cryptogramma	1040	Digitalis	620
Corallroot	807	Cryptomeria	771	Digitaria	945, 946
Corallroot	54	Cuckoo-flower	53	Digraphis	951
Corchorus	235	Cuckoo-pint	779	Dillseed	354
Cordgrass	977	Cucubalus	102, 107, 108	Dioscorideæ	841
Coreopsis	413	Cucumber	290	Diosma	174
Coriander	372	Cucurbitaceæ	289	Diotis	434
Coriandrum	372	Cudweed	438	Dipladenia	556
Cornaceæ	376	Cuphea	287	Diploaxis	61, 62
Corn Cockle	113	Currant	301, 302	Dipsacæ	403
Cornel	376	Cuscuta	571	Dipsacus	403
Cornel Fam.	376	Cyathæa	1058	Disandra	619
Cornflag	834	Cyclamen	540	Dock	706
Cornflower	472	Cynara	413	Dodder	571
Corn Marigold	426	Cynodon	975	Dodecatheon	536
Cornsalad	400	Cynoglossum	589	Dog's Mercury	736
Cornus	376	Cynosurus	997	Dog's-tail	997
Coronilla	182	Cyperaceæ	884	Dogwood	377
Coronopus	83	Cyperus	885	Dog Violet (Erythro-	
Correa	174	Cyphel	117	nium)	844
Corrigiola	686	Cypress	771	Doronic	453
Corydal	37	Cypripede	830	Doronicum	453
Corydalis	37	Cypripedium	830	Draba	70
Corylus	753	Cystopteris	1058	Dracocephalum	642
Corynephorus	969	Cytisus	182	Dropwort	239, 343
Cotoneaster	271			Drosera	315
Cotton-grass	902	Daboecia (Menziesia)	525	Dryas	240
Cotton-rush	902	Dactylis	997	Dry-rot	1018
Cotton-sedge	902	Dactylis	977	Duckweed	780
Cotton Thistle	469	Daffodil	838	Duckweed Fam.	780
Cotyledon	292	Daffy-down-dilly	838	Dwale	595
Coughgrass	983	Dahlia	413	Dyer's Rocket	89
Cowbane	326	Daisy	424		
Cowberry	520	Daisy	416, 426	Earthnut	335, 361
Cow Parsnip	357	Damasonium	798	Echeveria	291
Cowslip	536, 539	Dame's-violet	55	Echinochloa	948
Cowwheat	638	Damson	237	Echinops	413
Crab-tree	267	Dandelion	459	Echinoppermum	574
Crambe	86	Danewort	380	Echium	574
Cranberry	520	Daphne	722	Edwardsia	182
Crane's-bill	159	Daphne Fam.	722	Egg-plant	593
Crassula	291	Darnel	986	Elæagnaceæ	723
Crasulaceæ	291	Datura	591	Elæagnus	723
Crassula Fam.	291	Daucus	368	Elæagnus Fam.	723
Cratægus	270	Deadly Nightshade		Elatinaceæ	138
Cratægus	268	(Atropa)	595	Elatine	138
Crepis	490	Dead Nettle	670	Elatine Fam.	138
Cress	80	Delphinium	22	Elder	379
Cress	44, 45, 49, 50, 83	Dentaria	54	Elecampane	421
Crinum	837	Deodara	772	Eleocharis	894, 895
Crithmum	352	Deutzia	303	Elm	745
Crocus	836	Devil-in-the-bush	3	Elm Fam.	745

PAGE		PAGE		PAGE	
Elodea	801	<i>Fenugreek</i>	195	<i>Gardenia</i>	386
Elymus	979	<i>Fern Fam.</i>	1031	<i>Garlick</i>	860
<i>Elymus</i>	981	<i>Fescue</i>	993	<i>Garlick Mustard</i>	58
Empetraceæ	738	<i>Festuca</i>	993	<i>Gastridium</i>	964
<i>Empetrum</i>	738	<i>Festuca</i>	992	<i>Gaura</i>	273
<i>Endymion</i>	858	<i>Feverfew</i>	427	<i>Genista</i>	184
<i>Enchanter's Nightshade</i>	282	<i>Ficus</i>	741	<i>Gentian</i>	561
<i>Epacris</i>	518	<i>Field Madder</i>	396	<i>Gentiana</i>	561
<i>Epilobe</i>	273	<i>Fig</i>	741	<i>Gentianaceæ</i>	558
<i>Epilobium</i>	273	<i>Figwort</i>	13, 614	<i>Gentianella</i>	562
<i>Epimedium</i>	26	<i>Filago</i>	443, 444, 445	<i>Gentian Fam.</i>	558
<i>Epipactis</i>	808	<i>Filarea</i>	554	<i>Geraniaceæ</i>	158
<i>Epipactis</i>	810, 811	<i>Filbert</i>	754	<i>Geranium</i>	159
<i>Epipogium</i>	814	<i>Filices</i>	1031	<i>Geranium Fam.</i>	158
<i>Equisetaceæ</i>	1024	<i>Filmy Fern</i>	1062	<i>Germander</i>	672
<i>Equisetum</i>	1024	<i>Fir</i>	771	<i>Gesneria</i>	603
<i>Equisetum Fam.</i>	1024	<i>Flag</i>	832	<i>Geum</i>	241
<i>Eranthis</i>	3, 20	<i>Flax</i>	148	<i>Gilia</i>	567
<i>Erica</i>	526	<i>Flax Fam.</i>	148	<i>Gillflower</i>	42, 43
<i>Erica</i>	525	<i>Fleabane</i>	417, 423	<i>Gipsywort</i>	614
<i>Ericaceæ</i>	517	<i>Flixweed</i>	58	<i>Gladdon</i>	833
<i>Erigeron</i>	416	<i>Flowering Rush</i>	794	<i>Gladiolus</i>	833
<i>Eriocaulon</i>	883	<i>Fœniculum</i>	347	<i>Glasswort</i>	691
<i>Eriophorum</i>	902	<i>Fool's Parsley</i>	346	<i>Glaucium</i>	34
<i>Erodium</i>	168	<i>Forget-me-not</i>	580	<i>Glaux</i>	544
<i>Erophila</i>	73	<i>Forsythia</i>	554	<i>Glechoma</i>	655
<i>Erucastrium</i>	66	<i>Foxglove</i>	620	<i>Gleditschia</i>	180
<i>Ervum</i>	221, 222	<i>Foxtail</i>	955	<i>Globeflower</i>	19
<i>Eryngium</i>	324	<i>Fragaria</i>	248	<i>Globe-Thistle</i>	413
<i>Eryngo</i>	324	<i>Fragaria</i>	249	<i>Gloxinia</i>	603
<i>Erysimum</i>	59	<i>Frankenia</i>	100	<i>Glyceria</i>	1002, 1003
<i>Erysimum</i>	44, 58	<i>Frankenia Fam.</i>	99	<i>Glycine</i>	182
<i>Erythraea</i>	560	<i>Frankeniaceæ</i>	99	<i>Gnaphalium</i>	438
<i>Erythronium</i>	844	<i>Fraxinella</i>	174	<i>Goat's-beard</i>	475
<i>Escallonia</i>	303	<i>Fraxinus</i>	554	<i>Gold-of-Pleasure</i>	73
<i>Eschscholtzia</i>	29	<i>French Bean</i>	182	<i>Goldenrod</i>	419
<i>Eupatorium</i>	413	<i>French Honeysuckle</i>	182	<i>Golden Samphire</i>	422
<i>Eupatory</i>	413	<i>French Willow</i>	275	<i>Golden Saxifrage</i>	313
<i>Euphorbiaceæ</i>	727	<i>Fritillaria</i>	851	<i>Goldilocks</i>	14, 419
<i>Euphorbia</i>	727	<i>Fritillary</i>	851	<i>Gomphrena</i>	691
<i>Euphrasia</i>	633	<i>Frogbit</i>	802	<i>Goodenia</i>	506
<i>Eutoca</i>	574	<i>Fuchsia</i>	273	<i>Good King Henry</i>	700
<i>Evening Primrose</i>	280	<i>Fumaria</i>	35	<i>Goodyera</i>	817
<i>Everlasting</i>	413, 440	<i>Fumaria</i>	37	<i>Gooseberry</i>	300
<i>Evonymus</i>	177	<i>Fumariaceæ</i>	35	<i>Goosefoot</i>	693
<i>Exacum</i>	559	<i>Fumitory</i>	35	<i>Goosefoot Fam.</i>	690
<i>Eyebright</i>	633	<i>Fumitory Fam.</i>	35	<i>Goosegrass</i>	393
<i>Fabiana</i>	591	<i>Funckia</i>	844	<i>Gorse</i>	182
<i>Fagopyrum</i>	715	<i>Fungi</i>	1018	<i>Gourd</i>	290
<i>Fagus</i>	754	<i>Furze</i>	182	<i>Gourd Fam.</i>	289
<i>False-Brome</i>	986	<i>Gagea</i>	854	<i>Goutweed</i>	332
<i>False-Oat</i>	973	<i>Galanthus</i>	839	<i>Gramineæ</i>	936
<i>Featherfoil</i>	537	<i>Gale</i>	749	<i>Grape Hyacinth</i>	859
<i>Feathergrass</i>	943	<i>Galeobdolon</i>	671	<i>Grape Vine</i>	178
<i>Fedia</i>	401	<i>Galeopsis</i>	664	<i>Grass Fam.</i>	936
<i>Fennel</i>	347	<i>Galingale</i>	886	<i>Grass-of-Parnassus</i>	315
<i>Fennel</i>	354, 355	<i>Galium</i>	887	<i>Grass Vetch</i>	228
				<i>Grasswack</i>	783

PAGE		PAGE		PAGE	
<i>Greek Valerian</i> . . .	568	<i>Hepaticæ</i> . . .	1018	<i>Hymenophyll</i> . . .	1061
<i>Greenweed</i> . . .	184	<i>Heracleum</i> . . .	357	<i>Hymenophyllum</i> . . .	1061
<i>Gromwell</i> . . .	578, 579	<i>Herb-Bennet</i> . . .	241	<i>Hyoscyamus</i> . . .	592
<i>Ground Ivy</i> . . .	655	<i>Herb-Christopher</i> . . .	24	<i>Hyoseris</i> . . .	502
<i>Groundsel</i> . . .	447	<i>Herb-Paris</i> . . .	844	<i>Hypericineæ</i> . . .	139
<i>Guelder-Rose</i> . . .	382	<i>Herb-Robert</i> . . .	163	<i>Hypericum</i> . . .	140
<i>Guernsey Lily</i> . . .	837	<i>Herminium</i> . . .	827	<i>Hypericum Fam.</i> . . .	139
<i>Gymnadenia</i> . . .	824, 825	<i>Herniaria</i> . . .	687	<i>Hypochære</i> . . .	481
<i>Gymnogram</i> . . .	1041	<i>Herniary</i> . . .	687	<i>Hypocharis</i> . . .	481
<i>Gymnogramma</i> . . .	1041	<i>Hesperis</i> . . .	55	<i>Hyssop</i> . . .	642
<i>Gynerium</i> . . .	1016	<i>Hibiscus</i> . . .	151, 155		
<i>Gypsophyll</i> . . .	102	<i>Hieracium</i> . . .	494	<i>Iberis</i> . . .	77
		<i>Hieracium</i> . . .	493, 494	<i>Ilex</i> . . .	552
<i>Habenaria</i> . . .	825	<i>Hierochloe</i> . . .	948	<i>Ilex</i> . . .	756
<i>Hairbell</i> , see <i>Harebell</i>	515	<i>Hippocastaneæ</i> . . .	175	<i>Illecebrum</i> . . .	688
<i>Hairgrass</i> . . .	970	<i>Hippocrepis</i> . . .	218	<i>Impatiens</i> . . .	172
<i>Halesia</i> . . .	553	<i>Hippophae</i> . . .	723	<i>Imperatoria</i> . . .	356
<i>Halorageæ</i> . . .	273	<i>Hippuris</i> . . .	285	<i>Indian Corn</i> . . .	943
<i>Hardheads</i> . . .	471	<i>Hog's-fennel</i> . . .	355	<i>Indigo</i> . . .	182
<i>Harebell</i> . . .	515	<i>Hogweed</i> . . .	357	<i>Inula</i> . . .	420
<i>Hare's-ear</i> . . .	60, 340	<i>Holcus</i> . . .	974	<i>Inule</i> . . .	420
<i>Hare's-tail</i> . . .	959	<i>Iolcus</i> . . .	973	<i>Ipomæa</i> . . .	568
<i>Hart's-tongue</i> . . .	1054	<i>Holly</i> . . .	552	<i>Irideæ</i> . . .	831
<i>Hartwort</i> . . .	358	<i>Holly Fam.</i> . . .	552	<i>Iris</i> . . .	832
<i>Hautboy</i> . . .	248	<i>Holly Fern</i> . . .	1042	<i>Iris Fam.</i> . . .	831
<i>Hawkbit</i> . . .	478	<i>Hollyhock</i> . . .	155	<i>Isatis</i> . . .	84
<i>Hawkweed</i> . . .	494	<i>Holosteum</i> . . .	123	<i>Isardia</i> . . .	281
<i>Hawkweed</i> . . .	490, 493	<i>Holygrass</i> . . .	948	<i>Isoetes</i> . . .	1019
<i>Hawthorn</i> . . .	270	<i>Honckeneya</i> . . .	118, 120	<i>Isolepis</i> . . .	897, 898
<i>Hazel</i> . . .	753	<i>Honesty</i> . . .	42	<i>Isopyrum</i> . . .	3
<i>Heartsease</i> . . .	97	<i>Honeysuckle</i> . . .	383	<i>Ivy</i> . . .	373
<i>Heath</i> . . .	526	<i>Honeysuckle</i> . . .	182	<i>Ixia</i> . . .	832, 835
<i>Heath</i> . . .	525	<i>Honeysuckle Fam.</i> . . .	378		
<i>Heath Fam.</i> . . .	517	<i>Hop</i> . . .	744	<i>Jacob's Ladder</i> . . .	568
<i>Hedera</i> . . .	373	<i>Hordeum</i> . . .	980	<i>Jasione</i> . . .	507
<i>Hedge Mustard</i> . . .	57	<i>Horehound</i> . . .	660	<i>Jasmineæ</i> . . .	553
<i>Hedge Parsley</i> . . .	366	<i>Horehound</i> . . .	666	<i>Jerusalem Artichoke</i> . . .	413
<i>Hedynois</i> . . .	479, 480	<i>Hornbeam</i> . . .	753	<i>Jessamine</i> . . .	554
<i>Hedysarum</i> . . .	182, 219	<i>Horned Podweed</i> . . .	785	<i>Jessamine Fam.</i> . . .	553
<i>Helianthemum</i> . . .	91	<i>Horned Poppy</i> . . .	34	<i>Jointed Charlock</i> . . .	87
<i>Helianthus</i> . . .	413	<i>Hornwort</i> . . .	739	<i>Judas-tree</i> . . .	180
<i>Helichrysum</i> . . .	413	<i>Horse Chestnut</i> . . .	174	<i>Juglans</i> . . .	749
<i>Heliotrope</i> . . .	415, 574	<i>Horseradish</i> . . .	67	<i>Juncaceæ</i> . . .	869
<i>Hellebore</i> . . .	19	<i>Horse-tail</i> . . .	1026	<i>Juncus</i> . . .	869
<i>Helleborus</i> . . .	19	<i>Hottonia</i> . . .	536	<i>Juncus</i> . . .	880, 882
<i>Helminth</i> . . .	476	<i>Hound's-tongue</i> . . .	589	<i>Juniper</i> . . .	772
<i>Helminthia</i> . . .	476	<i>Houseleek</i> . . .	299	<i>Juniperus</i> . . .	772
<i>Helosciad</i> . . .	327	<i>Hoya</i> . . .	556	<i>Justicia</i> . . .	603
<i>Helosciadium</i> . . .	327	<i>Humulus</i> . . .	744		
<i>Hemerocallis</i> . . .	844	<i>Hutchinsia</i> . . .	78	<i>Kale</i> . . .	64
<i>Hemlock</i> . . .	369	<i>Hyacinth</i> . . .	844, 859	<i>Kalmia</i> . . .	518
<i>Hemlock</i> . . .	326	<i>Hyacinthus</i> . . .	859	<i>Kerria</i> . . .	235
<i>Hemp</i> . . .	741	<i>Hydrangea</i> . . .	303	<i>Kennedy</i> . . .	182
<i>Hemp Agrimony</i> . . .	413	<i>Hydrocharideæ</i> . . .	801	<i>Kidney Vetch</i> . . .	211
<i>Hemp Nettle</i> . . .	666	<i>Hydrocharis</i> . . .	802	<i>Knapweed</i> . . .	471
<i>Henbane</i> . . .	592	<i>Hydrocharis Fam.</i> . . .	801	<i>Knapweed</i> . . .	471
<i>Henbit</i> . . .	669	<i>Hypocotyle</i> . . .	392	<i>Knaulia</i> . . .	405
<i>Hepatica</i> . . .	6	<i>Hydrophyllum Fam.</i> . . .	574	<i>Knuwell</i> . . .	639

PAGE	PAGE	PAGE
<i>Knotgrass</i> 715	<i>Ligustrum</i> 555	<i>Lythraceæ</i> 286
<i>Kobresia</i> 904	<i>Lilac</i> 554	<i>Lythrum</i> 287
<i>Kœleria</i> 1014	<i>Liliaceæ</i> 842	<i>Lythrum Fam.</i> 286
<i>Kohlrabbi</i> 64	<i>Lily</i> 844, 847, 848	
<i>Koniga</i> 69	<i>Lily Fam.</i> 842	<i>Madder</i> 386
	<i>Lily-of-the-Valley</i> 847	<i>Madder</i> 396
<i>Labiatae</i> 640	<i>Lime</i> 157	<i>Madder Fam.</i> 385
<i>Labiata Fam.</i> 640	<i>Lime Fam.</i> 157	<i>Madwort</i> 588
<i>Laburnum</i> 182	<i>Limnanth</i> 566	<i>Magnolia</i> 25
<i>Lactuca</i> 483	<i>Limnanthemum</i> 566	<i>Mahaleb</i> 235
<i>Lady Fern</i> 1048	<i>Limosel</i> 618	<i>Mahonia</i> 26
<i>Ladies' Bedstraw</i> 389	<i>Limosella</i> 618	<i>Maianthemum</i> 848
<i>Lady's-fingers</i> 211	<i>Linaceæ</i> 148	<i>Maidenhair</i> 1051, 1057
<i>Lady's-mantle</i> 256	<i>Linaria</i> 610	<i>Maize</i> 943
<i>Lady's-smock</i> 53	<i>Ling</i> 527	<i>Malachium</i> 128
<i>Lady's-slipper</i> 850	<i>Linnæa</i> 385	<i>Malaxis</i> 805
<i>Lady's-tresses</i> 815	<i>Linosyris</i> 419	<i>Malcolmia</i> 56
<i>Lagurus</i> 959	<i>Linseed</i> 149	<i>Male Fern</i> 1045
<i>Lamb's Lettuce</i> 460	<i>Linum</i> 148	<i>Mallow</i> 153
<i>Lamium</i> 668	<i>Liparis</i> 806	<i>Mallow Fam.</i> 151
<i>Lancashire Asphodel</i> . . . 866	<i>Liquidambar</i> 749	<i>Malope</i> 152
<i>Lantana</i> 676	<i>Listera</i> 812	<i>Malva</i> 153
<i>Lapsana</i> 502	<i>Listera</i> 813	<i>Malvaceæ</i> 151
<i>Lapsana</i> 502	<i>Lithosperm</i> 578	<i>Mandevilla</i> 556
<i>Larch</i> 772	<i>Lithospermum</i> 578	<i>Mandrake</i> 521
<i>Larkspur</i> 22	<i>Littorel</i> 685	<i>Manettia</i> 386
<i>Lastrea</i> 1043-1047	<i>Littorella</i> 685	<i>Mangel Wurzel</i> 701
<i>Lathræa</i> 601	<i>Livelong</i> 295	<i>Man Orchis</i> 827
<i>Lathyrus</i> 227	<i>Lloydia</i> 853	<i>Maple</i> 175
<i>Laurel</i> 236, 723	<i>Lobelia</i> 506	<i>Maple Tribe</i> 174
<i>Laurustinus</i> 381	<i>Loiseleuria</i> 524	<i>Maram</i> 964
<i>Lavatera</i> 152	<i>Lolium</i> 985	<i>Mare's-tail</i> 285
<i>Lavender</i> 642	<i>London Pride</i> 312	<i>Marigold</i> 13, 413, 426, 455
<i>Leadwort</i> 677	<i>London Rocket</i> 57	<i>Marjoram</i> 651
<i>Leek</i> 860	<i>Lonicera</i> 383	<i>Marrubium</i> 660
<i>Leersia</i> 943	<i>Loosestrife</i> 287, 541	<i>Marsh Fern</i> 1043
<i>Leguminosæ</i> 180	<i>Lophospermum</i> 604	<i>Marsh Mallow</i> 155
<i>Leguminous Fam.</i> 180	<i>Loranthaceæ</i> 374	<i>Marsh Marigold</i> 18
<i>Lemna</i> 780	<i>Lords-and-Ladies</i> 779	<i>Marsh Pennywort</i> 322
<i>Lemnaceæ</i> 780	<i>Lotus</i> 209	<i>Marsh Trefoil</i> 565
<i>Lentibulacææ</i> 548	<i>Lousewort</i> 656	<i>Masterwort</i> 356
<i>Leonotis</i> 642	<i>Lovage</i> 349	<i>Matgrass</i> 978
<i>Leontodon</i> 478	<i>Love-apple</i> 593	<i>Matweed</i> 964
<i>Leontodon</i> 489	<i>Love-lies-bleeding</i> 691	<i>Matricaria</i> 428
<i>Leonurus</i> 667	<i>Lucern</i> 190	<i>Matricaria</i> 427, 428
<i>Leopard's-bane</i> 454	<i>Ludulia</i> 386	<i>Matthiola</i> 42
<i>Lepidium</i> 80	<i>Ludwigia</i> 281	<i>Maurandia</i> 604
<i>Lepidium</i> 78, 84	<i>Lunaria</i> 42	<i>May</i> 270
<i>Lepigonum</i> 132	<i>Lungwort</i> 576	<i>May Lily</i> 848
<i>Lepturnus</i> 977	<i>Lupine</i> 182	<i>Mayweed</i> 430
<i>Lesser Celandine</i> 13	<i>Luzula</i> 879	<i>Maywort</i> 388
<i>Lettuce</i> 483	<i>Lychnis</i> 111	<i>Meadow Rue</i> 5
<i>Leucolium</i> 840	<i>Lycopodiaceæ</i> 1018	<i>Meadow Saffron</i> 868
<i>Leycesteria</i> 378	<i>Lycopodium</i> 1020	<i>Meadowsweet</i> 239
<i>Libanotis</i> 348	<i>Lycopsis</i> 585	<i>Meconopsis</i> 32
<i>Lichens</i> 1018	<i>Lycopus</i> 644	<i>Medicago</i> 189
<i>Ligusticum</i> 349	<i>Lymegrass</i> 979	<i>Medick</i> 189
<i>Ligusticum</i> 370	<i>Lysimachia</i> 541	<i>Medlar</i> 272

	PAGE		PAGE		PAGE
Melampyre	637	Montia	136	Nitgrass	964
Meiampyrum	637	Moonwort	1035	Nolana	591
Melandrium	111	Morus	741	None-so-pretty	312
Melastomaceæ	287	Moschatel	378	Nonsuch	191
Melica	1012	Mosses	1018	Nuphar	28
Melica	1011	Motherwort	667	Nut	754
Melick	1012	Moulds	1018	Nymphæa	27
Melilot	193	Mountain Ash	269	Nymphæaceæ	26
Melilotus	193	Mountain Everlasting	440		
Melissa	642, 653	Mountain Fern	1044	Oak	755
Melittis	659	Mouse-ear Chickweed	125	Oak Fern	1039
Melon	290	Mousetail	8	Oat	970
Mentha	645	Moutan	25	Ocymum	642
Menyanthes	565	Mugwort	437	Enanth	342
Menyanthes	5 6	Mulberry	741	Enanthe	342
Menziesia	525	Mulgedium	488	Enothera	280
Mercurialis	736	Mullein	604	Enothera Fam.	273
Mercury	736	Muscari	859	Old-Man's-Beard	3
Mertensia	577	Mushrooms	1018	Olea	554
Mesembryanthemum Fam.	292	Musk Orchis	827	Oleander	556
Mespilus	272	Mustard	58, 59, 65, 66	Olive	554
Mespilus	270	Myosote	550	Omphalodes	589
Meu	351	Myosotis	580	Onagraceæ	273
Meum	351	Myosurus	8	Onion	860
Mezereon	722	Myrica	749	Onobrychis	219
Michaelmas Daisy	416	Myriophyll	284	Ononis	187
Midsummer-men	294	Myriophyllum	294	Onopord	469
Mignonette	88	Myrrhis	360	Onopordon	469
Mignonette Fam.	88	Myrsinaceæ	536	Ophioglossum	1034
Mildeus	1018	Myrtle	272	Ophrys	828
Milfoil	284, 432			Ophrys	806, 807,
Milium	943	Naiad	785		812, 813, 815, 827
Milium	964	Naiad Fam.	782	Orache	701
Milk Parsley	355	Naiadeæ	782	Orchideæ	803
Milk Vetch	214	Naias	795	Orchid Fam.	803
Milkwort	98	Narcissus	838	Orchis	817
Milkwort	544	Nard	978	Orchis	825
Milkwort Fam.	98	Nardus	978	Origanum	651
Millet	914	Narthecium	866	Ornithogalum	855
Millettia	182	Nasturtium	45	Ornithogalum	854
Mimosa	181	Nasturtium	159	Ornithopus	217
Mimulus	617	Navelwort	293	Orobanchaceæ	595
Mint	645	Nectarine	236	Orobanche	596
Mistletoe	375	Negundo	175	Orobanch	223, 233
Mistletoe Fam.	374	Nelumbo	27	Orpine	295
Mithridate Mustard	75	Nemophila	574	Osier	760, 762
Mithridate Pepperwort	80	Neottia	813	Osmund	1036
Mehringia	118	Neottia	815	Osmunda	1036
Monenchia	122	Nepeta	655	Osmunda	1035
Molinia	1011	Nerium	556	Oxalis	171
Monarda	642	Nettle	742	Oxeye Daisy	426
Moneses (Pyrola)	531	Nettle	666, 670	Oxtip	539
Monneywort	543	Nettle Fam.	741	Oxyria	713
Monkshood	23	Nicotiana	591	Oxytropis	214
Monocotyledons	774	Nierembergia	591		
Monotropa	534	Nigella	3	Pæonia	24
Monotrope	534	Nightshade	593	Pæony	24
		Nipplewort	502		

	PAGE		PAGE		PAGE
<i>Pampas grass</i>	1016	<i>Pheasant's-eye</i>	8	<i>Polypodium</i>	1037
<i>Pancratium</i>	837	<i>Phellandrium</i>	345	<i>Polypodium</i>	1042, 1060
<i>Panicum</i>	944	<i>Philadelphus</i>	303	<i>Polypody</i>	1037
<i>Panicum</i>	976	<i>Phillyrea</i>	554	<i>Polypogon</i>	959
<i>Pansy</i>	97	<i>Phleum</i>	952	<i>Polystichum</i>	1042, 1043
<i>Papaver</i>	29	<i>Phlomis</i>	642	<i>Pondweed</i>	787
<i>Papaveraceæ</i>	28	<i>Phlox</i>	567	<i>Pondweed</i>	785
<i>Papilionaceæ</i>	180	<i>Phragmites</i>	1016	<i>Poplar</i>	768
<i>Parietaria</i>	743	<i>Physalis</i>	591	<i>Poppy</i>	29
<i>Paris</i>	844	<i>Physosperm</i>	370	<i>Poppy Fam.</i>	28
<i>Parnassia</i>	314	<i>Physospermum</i>	370	<i>Poppy (Horned)</i>	34
<i>Paronychia</i>	688	<i>Phyteuma</i>	508	<i>Poppy (Prickly)</i>	29
<i>Paronychia Fam.</i>	685	<i>Picris</i>	477	<i>Poppy (Sea)</i>	34
<i>Paronychiaceæ</i>	685	<i>Pignut</i>	335, 361	<i>Poppy (Welsh)</i>	32
<i>Parsley</i>	330	<i>Pillwort</i>	1020	<i>Populus</i>	768
<i>Parsley</i> 329, 346, 355, 366		<i>Pilularia</i>	1020	<i>Portugal Laurel</i>	236
<i>Parsley Fern</i>	1040	<i>Pimelea</i>	722	<i>Portulacææ</i>	135
<i>Parsley Piert</i>	257	<i>Pimpernel</i>	545	<i>Potamogeton</i>	787
<i>Parsnip</i>	356	<i>Pimpinell</i>	337	<i>Potato</i>	593
<i>Parsnip</i>	336, 357	<i>Pimpinella</i>	337	<i>Potentil</i>	248
<i>Pasque-flower</i>	7	<i>Pimpinella</i>	332	<i>Potentilla</i>	248
<i>Passion-flower</i>	290	<i>Pinguicula</i>	548	<i>Poterium</i>	259
<i>Pastinaca</i>	356	<i>Pinguicula Fam.</i>	548	<i>Pourretia</i>	844
<i>Patchouly</i>	642	<i>Pine</i>	771	<i>Prenanthes</i>	484
<i>Paulownia</i>	604	<i>Pine-apple</i>	844	<i>Prickly Poppy</i>	29
<i>Pavonia</i>	152	<i>Pine Fam.</i>	770	<i>Primrose</i>	537
<i>Pea</i>	227	<i>Pink</i>	102	<i>Primrose Fam.</i>	535
<i>Peach</i>	236	<i>Pink Fam.</i>	100	<i>Primrose Peerless</i>	839
<i>Peaflower Tribe</i>	180	<i>Pinus</i>	771	<i>Primula</i>	537
<i>Pear</i>	266	<i>Piptanthus</i>	182	<i>Primulaceæ</i>	535
<i>Pearlwort</i>	115	<i>Pisum</i>	228, 232	<i>Prince's-feather</i>	691
<i>Pedicularis</i>	635	<i>Plane</i>	749	<i>Privet</i>	554
<i>Pelargonium</i>	159	<i>Plantaginææ</i>	681	<i>Prunella</i>	656
<i>Pellitory</i>	743	<i>Plantago</i>	681	<i>Prunus</i>	235
<i>Pennyeress</i>	75	<i>Plantain</i>	681	<i>Psamma</i>	964
<i>Pennyroyal</i>	649	<i>Plantain</i>	796	<i>Pseudathyrium</i>	1039
<i>Pennywort</i>	293, 322	<i>Plantain Fam.</i>	681	<i>Ptarmica</i>	432
<i>Pentas</i>	386	<i>Platanus</i>	749	<i>Pteris</i>	1056
<i>Pentstemon</i>	604	<i>Platystemon</i>	29	<i>Pteris</i>	1040
<i>Peplis</i>	289	<i>Ploughman's-Spikenard</i>	422	<i>Pulicaria</i>	423
<i>Pepper Saxifrage</i>	350	<i>Plum</i>	237	<i>Pulmonaria</i>	576
<i>Pepperwort</i>	80	<i>Plumbaginææ</i>	677	<i>Pulmonaria</i>	577
<i>Perilla</i>	642	<i>Plumbago</i>	677	<i>Pumpkin</i>	290
<i>Periploca</i>	556	<i>Plumbago Fam.</i>	677	<i>Purple Loosestrife</i>	287
<i>Periwinkle</i>	556	<i>Poa</i>	1001	<i>Purstone</i> 120, 135, 289, 702	
<i>Periwinkle Fam.</i>	556	<i>Poinsettia</i>	727	<i>Purslane Fam.</i>	135
<i>Persicaria</i>	715, 719	<i>Polemoniaceæ</i>	567	<i>Pyrethrum</i>	427, 428
<i>Petasites</i>	415	<i>Polemonium</i>	567	<i>Pyrola</i>	531
<i>Petroselinum</i>	330	<i>Polemonium Fam.</i>	567	<i>Pyrus</i>	265
<i>Petty Whin</i>	186	<i>Polyanthus</i>	538, 844		
<i>Petunia</i>	591	<i>Polycarp</i>	134	<i>Quake-grass</i>	999
<i>Peucedan</i>	354	<i>Polycarpon</i>	134	<i>Quamoclit</i>	569
<i>Peucedanum</i>	354	<i>Polygala</i>	98	<i>Quercus</i>	755
<i>Peucedanum</i>	350	<i>Polygalaceæ</i>	98	<i>Quillwort</i>	1019
<i>Phalaris</i>	950	<i>Polygonaceæ</i>	705	<i>Quince</i>	266
<i>Phalaris</i>	951, 954, 955	<i>Polygonatum</i>	845		
<i>Pharbitis</i>	569	<i>Polygonum</i>	714	<i>Radiola</i>	151
<i>Phaseolus</i>	182	<i>Polygonum Fam.</i>	705	<i>Radish</i>	87

	PAGE		PAGE		PAGE
<i>Ragged Robin</i>	113	<i>Rudbeckia</i>	413	<i>Saussurea</i>	459
<i>Ragwort</i>	450	<i>Rue</i>	174	<i>Savin</i>	773
<i>Rampion</i>	508	<i>Ruellia</i>	603	<i>Savory</i>	642
<i>Ramps</i>	514	<i>Rumex</i>	706	<i>Sawwort</i>	458
<i>Ramsons</i>	864	<i>Rumex</i>	713	<i>Saxifraga</i>	304
<i>Ranunculaceæ</i>	1	<i>Rupia</i>	786	<i>Saxifragaceæ</i>	303
<i>Ranunculus</i>	9	<i>Rupture-wort</i>	687	<i>Saxifrage</i>	304
<i>Ranunculus Fam.</i>	1	<i>Ruscus</i>	850	<i>Saxifrage</i>	313, 338, 350
<i>Rapessed</i>	64	<i>Rush</i>	869	<i>Saxifrage Fam.</i>	303
<i>Raphanus</i>	87	<i>Rush</i>	794, 887, 902, 1029	<i>Scabiosa</i>	405
<i>Raspberry</i>	243, 244	<i>Rush Fam.</i>	869	<i>Scabious</i>	405
<i>Ratstail</i>	995	<i>Ruta</i>	174	<i>Scavola</i>	506
<i>Rattle</i>	634	<i>Rye</i>	943	<i>Scandix</i>	359
<i>Red Rattle</i>	636	<i>Rye-grass</i>	985	<i>Scandix</i>	360, 364
<i>Reed</i>	1016			<i>Scarlet Runner</i>	182
<i>Reed-mace</i>	775	<i>Saffron</i>	836, 868	<i>Schenchzeria</i>	798
<i>Reseda</i>	88	<i>Sage</i>	642	<i>Schizanthus</i>	604
<i>Resedaceæ</i>	88	<i>Sagina</i>	115	<i>Schœnus</i>	887
<i>Restiaceæ</i>	883	<i>Sagina</i>	123	<i>Schœnus</i>	888, 889, 890, 891, 904
<i>Restharrow</i>	187	<i>Sagittaria</i>	794	<i>Scilla</i>	857
<i>Restio Fam.</i>	883	<i>Sainfoin</i>	219	<i>Scirpus</i>	892
<i>Rhamnaceæ</i>	178	<i>St. Dabeoc's Heath</i> . . .	525	<i>Scleranth</i>	688
<i>Rhamnus</i>	178	<i>St. John's-wort</i>	142	<i>Scleranthus</i>	688
<i>Rheum</i>	706	<i>St. Patrick's Cabbage</i> . .	312	<i>Sclerochloa</i> 1003, 1004, 1005	
<i>Rhinanthus</i>	634	<i>Salicaria</i>	287	<i>Scolopendrium</i>	1054
<i>Rhodiola</i>	294	<i>Salicorn</i>	691	<i>Scorzonera</i>	413, 475
<i>Rhododendron</i>	518	<i>Salicornia</i>	691	<i>Scottish Asphodel</i> . . .	867
<i>Rhubarb</i>	706	<i>Salix</i>	757	<i>Scouring Rush</i>	1029
<i>Rhus</i>	180	<i>Sallow</i>	762	<i>Scrophularia</i>	614
<i>Rhynchospora</i>	889	<i>Sallow Thorn</i>	724	<i>Scrophularia Fam.</i> . . .	602
<i>Ribbon-grass</i>	952	<i>Salpiglossis</i>	604	<i>Scrophulariaceæ</i>	602
<i>Ribes</i>	300	<i>Salsify</i>	475	<i>Scurry-grass</i>	67
<i>Ribes Fam.</i>	300	<i>Salsola</i>	693	<i>Scutellaria</i>	657
<i>Ribesiaceæ</i>	300	<i>Salsola</i>	692	<i>Sea Buckthorn</i>	724
<i>Ribwort</i>	683	<i>Saltwort</i>	693	<i>Sea Heath</i>	100
<i>Roastbeef-plant</i>	833	<i>Saltwort</i>	544	<i>Sea Holly</i>	324
<i>Robinia</i>	182	<i>Salvia</i>	642	<i>Seakale</i>	86
<i>Rochea</i>	291	<i>Sambucus</i>	379	<i>Sea Lavender</i>	678
<i>Rockbrakes</i>	1040	<i>Samole</i>	547	<i>Sea Matweed</i>	964
<i>Rockcist</i>	91	<i>Samolus</i>	547	<i>Sea Milkwort</i>	544
<i>Rock-cress</i>	47	<i>Samphire</i>	352	<i>Sea Poppy</i>	34
<i>Rocket</i>	44, 61, 86, 88	<i>Samphire</i>	422	<i>Sea Purslane</i>	120, 702
<i>Rock-rose</i>	93	<i>Sandalwood Fam.</i>	724	<i>Sea Rocket</i>	86
<i>Rœmeria</i>	33	<i>Sandspurry</i>	132	<i>Seaweeds</i>	1018
<i>Rosa</i>	261	<i>Sandwort</i>	118	<i>Secale</i>	943
<i>Rosaceæ</i>	234	<i>Sanguisorb</i>	258	<i>Sedge</i>	780
<i>Rose</i>	261	<i>Sanguisorba</i>	258	<i>Sedge Fam.</i>	884
<i>Rose (Christmas)</i>	20	<i>Sanicle</i>	322	<i>Sedum</i>	293
<i>Rosebay</i>	275	<i>Sanicula</i>	322	<i>Selaginella</i>	1021
<i>Rose Campion</i>	112	<i>Santalaceæ</i>	724	<i>Selfheal</i>	657
<i>Rose Fam.</i>	234	<i>Santolina</i>	434	<i>Selinum</i>	355
<i>Rosemary</i>	642	<i>Sapindaceæ</i>	174	<i>Sempervivum</i>	299
<i>Roseroot</i>	294	<i>Sapindus Fam.</i>	174	<i>Senebiera</i>	83
<i>Rottboellia</i>	978	<i>Saponaria</i>	105	<i>Senecio</i>	445
<i>Rowan-tree</i>	269	<i>Sarothamnus</i>	186	<i>Sensitive-plant</i>	181
<i>Rubia</i>	386	<i>Satureia</i>	642	<i>Sequoia</i>	771
<i>Rubiaceæ</i>	385	<i>Satyrion</i> 817, 823, 825, 826		<i>Serapius</i>	808-811
<i>Rubus</i>	243	<i>Sauce-alone</i>	58		

PAGE		PAGE		PAGE	
<i>Serrafalcus</i>	991	<i>Spanish Broom</i>	182	<i>Sweet Sedge</i>	780
<i>Serratula</i>	458	<i>Sparganium</i>	776	<i>Sweet William</i>	103
<i>Serratula</i>	459	<i>Spartina</i>	976	<i>Sweet Woodruff</i>	395
<i>Service tree</i>	268, 270	<i>Spartium</i>	182, 186	<i>Swine's-cress</i>	83
<i>Seseli</i>	348	<i>Spearwort</i>	12	<i>Sycamore</i>	176
<i>Sesleria</i>	1015	<i>Specularia</i>	517	<i>Symphoricarpos</i>	378
<i>Setaria</i>	946, 947	<i>Spergula</i>	133	<i>Symphytum</i>	586
<i>Shallot</i>	860	<i>Spergula</i>	116	<i>Syringa</i>	303, 554
<i>Shamrock</i>	207	<i>Spergularia</i>	132		
<i>Sheep's-bit</i>	507	<i>Spignel</i>	351	<i>Tucamahac</i>	768
<i>Shepherd's-needle</i>	359	<i>Spinage</i>	691	<i>Tugetes</i>	413
<i>Shepherd's-purse</i>	79	<i>Spindle-tree</i>	177	<i>Tamarisc</i>	137
<i>Shepherd's-weatherglass</i>	545	<i>Spirea</i>	238	<i>Tamarisc Fam.</i>	137
<i>Sherardia</i>	396	<i>Spiranth</i>	814	<i>Tamariscineæ</i>	137
<i>Shieldfern</i>	1042	<i>Spiranthes</i>	814	<i>Tamarix</i>	137
<i>Sibbaldia</i>	255	<i>Spleenwort</i>	1047	<i>Tamus</i>	841
<i>Sibthorpia</i>	619	<i>Spurge</i>	727	<i>Tanacetum</i>	434
<i>Silaus</i>	350	<i>Spurge Fam.</i>	727	<i>Tansey</i>	434
<i>Silene</i>	106	<i>Spurge Laurel</i>	723	<i>Taragon</i>	436
<i>Silverweed</i>	253	<i>Spurry</i>	133	<i>Taraxacum</i>	489
<i>Silybum</i>	461	<i>Squill</i>	857	<i>Taxodium</i>	721
<i>Simethis</i>	865	<i>Squinancy-wort</i>	395	<i>Taxus</i>	773
<i>Sinapis</i>	65, 66	<i>Stachys</i>	660	<i>Teasel</i>	403
<i>Sison</i>	329	<i>Stapelia</i>	556	<i>Teasel Fam.</i>	403
<i>Sison</i>	328, 331, 334	<i>Staphylea</i>	175	<i>Tecoma</i>	603
<i>Sisymbrium</i>	56	<i>Star-of-Bethlehem</i>	855	<i>Teesdalia</i>	77
<i>Sisymbrium</i>	45, 46, 50, 61, 62, 63	<i>Starwort</i>	127	<i>Terebinthaceæ</i>	180
<i>Sisyrinchium</i>	834	<i>Statice</i>	677	<i>Teucrium</i>	672
<i>Sium</i>	336	<i>Statice</i>	680	<i>Thalecress</i>	50
<i>Sium</i>	328	<i>Stellaria</i>	127	<i>Thalictrum</i>	4
<i>Skullcap</i>	657	<i>Stellaria</i>	127	<i>Thesium</i>	724
<i>Sloe</i>	236	<i>Stellatæ</i>	385	<i>Thibaudia</i>	518
<i>Smallreed</i>	965	<i>Stellate Tribe</i>	385	<i>Thistle</i>	460
<i>Smilacina</i>	848	<i>Stephanotus</i>	556	<i>Thistle</i>	413, 469
<i>Smyrnium</i>	371	<i>Stink Mayweed</i>	430	<i>Thlaspi</i>	75
<i>Snail-plant</i>	189	<i>Stipa</i>	943	<i>Thlaspi</i>	79, 80, 81
<i>Snake's-head</i>	851	<i>Stitchwort</i>	131, 132	<i>Thorn-apple</i>	592
<i>Snaketongue</i>	13	<i>Stock</i>	42	<i>Thorow-wax</i>	340
<i>Snakeweed</i>	718	<i>Stock (Virginia)</i>	56	<i>Thrift</i>	679
<i>Snapdragon</i>	608	<i>Stonecrop</i>	293	<i>Thrinacia</i>	480
<i>Sneezewort</i>	432	<i>Strapwort</i>	686	<i>Thuia</i>	771
<i>Snowberry</i>	378	<i>Stratiotes</i>	803	<i>Thyme</i>	650
<i>Snowdrop</i>	839	<i>Strawberry</i>	248	<i>Thymeleaceæ</i>	722
<i>Snowdrop-tree</i>	553	<i>Strawberry-tree</i>	521	<i>Thymus</i>	650
<i>Snowflake</i>	840	<i>Striped Grass</i>	952	<i>Thymus</i>	653
<i>Soapwort</i>	105	<i>Sturmia</i>	806	<i>Tigridia</i>	832
<i>Solanaceæ</i>	591	<i>Styrax</i>	553	<i>Tilia</i>	157
<i>Solanum</i>	593	<i>Suæda</i>	692	<i>Tiliaceæ</i>	157
<i>Solanum Fam.</i>	591	<i>Subularia</i>	74	<i>Tilleæ</i>	292
<i>Solidago</i>	419	<i>Succisa</i>	405	<i>Tillandsia</i>	844
<i>Solomon-seal</i>	845	<i>Succory</i>	501	<i>Timothy-grass</i>	953
<i>Sonchus</i>	486	<i>Sulphur-weed</i>	355	<i>Toadflax</i>	610, 725
<i>Sorbus</i>	269	<i>Sumach</i>	180	<i>Tobacco</i>	591
<i>Sorrel</i>	712, 713	<i>Sundew</i>	315	<i>Tofieldia</i>	867
<i>Southernwood</i>	436	<i>Sunflower</i>	413	<i>Tomato</i>	593
<i>Sowbread (Cyclamen)</i>	540	<i>Sweet Briar</i>	263	<i>Toothcress</i>	54
<i>Sowthistle</i>	486	<i>Sweet Flag</i>	780	<i>Toothwort</i>	601
		<i>Sweet Mountain Fern</i>	1044	<i>Tordylium</i>	358

PAGE		PAGE		PAGE	
<i>Torenia</i>	604	<i>Valerianææ</i>	396	<i>Water Purslane</i>	289
<i>Torilis</i>	365, 366, 367	<i>Valerian Fam.</i>	396	<i>Water-soldier</i>	803
<i>Tormentilla</i>	251	<i>Valerianella</i>	400	<i>Water Violet</i>	537
<i>Touch-me-not</i>	173	<i>Venus's-comb</i>	359	<i>Wayfaring-tree</i>	381
<i>Towercress</i>	49	<i>Venus's looking-glass</i> .	517	<i>Weigela</i>	378
<i>Tower Mustard</i>	48	<i>Verbascum</i>	604	<i>Weild</i>	89
<i>Trachelium</i>	506	<i>Verbena</i>	676	<i>Welsh Poppy</i>	32
<i>Tragopogon</i>	475	<i>Verbenacææ</i>	676	<i>Wheat</i>	983
<i>Traveller's-joy</i>	3	<i>Vernal-grass</i>	949	<i>Whin</i>	182, 186
<i>Treacle Mustard</i>	59	<i>Veronica</i>	621	<i>White Beam-tree</i>	268
<i>Trefoil</i>	209, 565	<i>Vervein</i>	676	<i>White-rot</i>	322
<i>Trichera</i>	405	<i>Vervein Fam.</i>	676	<i>Whitethorn</i>	270
<i>Trichomanes</i>	1060	<i>Vetch</i>	220	<i>Whitlow-grass</i>	73
<i>Trichonema</i>	835	<i>Vetch</i>	211, 214, 228	<i>Whortleberry</i>	519, 520
<i>Trientale</i>	544	<i>Vetchling</i>	228, 229	<i>Willow</i>	757
<i>Trientalis</i>	544	<i>Viburnum</i>	331	<i>Willow-herb</i>	275
<i>Trifolium</i>	196	<i>Vicia</i>	220	<i>Winberry (Bilberry)</i>	519
<i>Trifolium</i>	193, 195	<i>Victoria</i>	27	<i>Winter Aconite</i>	3, 20
<i>Triglochin</i>	799	<i>Villarsia</i>	566	<i>Winter Cherry</i>	591
<i>Trigonel</i>	195	<i>Vinca</i>	556	<i>Wintercress</i>	44
<i>Trigonella</i>	195	<i>Vine</i>	178	<i>Wintergreen</i>	531
<i>Trinia</i>	332	<i>Vinegar-plant</i>	1018	<i>Winter Heliotrope</i>	415
<i>Triodia</i>	1014	<i>Viola</i>	94	<i>Wistaria</i>	182
<i>Trisetum</i>	972	<i>Violacææ</i>	94	<i>Woad</i>	84
<i>Triticum</i>	983	<i>Violet</i>	94	<i>Wolfsbane</i>	23
<i>Triticum</i>	1005	<i>Violet</i>	55, 537	<i>Woodbine</i>	383
<i>Trollius</i>	19	<i>Violet Fam.</i>	94	<i>Woodruff</i>	395
<i>Tropæolum</i>	159	<i>Viper's Bugloss</i>	574	<i>Woodrush</i>	879
<i>Tuberose</i>	844	<i>Virginian Creeper</i> . . .	178	<i>Wood Sage</i>	672
<i>Tulip</i>	852	<i>Virginia Stock</i>	56	<i>Woodsia</i>	1060
<i>Tulipa</i>	852	<i>Viscaria</i>	111	<i>Wood Sorrel</i>	171
<i>Tulip tree</i>	25	<i>Viscum</i>	375	<i>Wormwood</i>	438
<i>Turnip</i>	64	<i>Vitex</i>	676	<i>Woundwort</i>	662
<i>Turritis</i>	48	<i>Vitis</i>	178		
<i>Tussilago</i>	414			<i>Xanthium</i>	456
<i>Tutsan</i>	142	<i>Wahlenbergia</i>	516		
<i>Twayblade</i>	812	<i>Wake-robin</i>	779	<i>Yam</i>	841
<i>Typha</i>	775	<i>Wallcress</i>	50	<i>Yam Fam.</i>	841
<i>Typhacææ</i>	775	<i>Wallflower</i>	43	<i>Yarrow</i>	432
		<i>Wall Pepper</i>	297	<i>Yellow-Bird's-nest</i>	535
<i>Ulex</i>	182	<i>Wall-Rue</i>	1052	<i>Yellow Cress</i>	46, 47
<i>Ulmacææ</i>	745	<i>Walnut</i>	749	<i>Yellow Rocket</i>	44
<i>Ulmus</i>	745	<i>Wartcress</i>	83	<i>Yellow Weed</i>	89
<i>Umbellate Fam.</i>	318	<i>Water Chickweed</i>	136	<i>Yellow-wort</i>	565
<i>Umbelliferæ</i>	318	<i>Watercress</i>	45	<i>Yew</i>	773
<i>Urtica</i>	742	<i>Water Dropwort</i>	343	<i>Yucca</i>	844
<i>Urticacææ</i>	741	<i>Water Hemlock</i>	326		
<i>Utricularia</i>	550	<i>Waterlily</i>	27, 28	<i>Zannichellia</i>	785
		<i>Waterlily Fam.</i>	21	<i>Zauschneria</i>	273
<i>Vaccinium</i>	518	<i>Water Milfoil</i>	284	<i>Zea</i>	943
<i>Valerian</i>	398	<i>Water Parsnip</i>	336	<i>Zinnia</i>	413
<i>Valeriana</i>	398	<i>Water Pepper</i>	139, 720	<i>Zostera</i>	783
<i>Valeriana</i>	397, 400, 402	<i>Water Plantain</i>	796		





